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Dual language and literacy development of Spanish-speaking preschool children

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Abstract

This article describes oral language and early literacy skills in Spanish and English for a sample of 319 bilingual children in Massachusetts and Maryland (ECS) and a comparison group of 144 monolingual Spanish-speaking children in Puerto Rico (PRC). Children were assessed as they entered and exited pre-kindergarten programs. Data collection included four subtests of the Woodcock Language Proficiency Battery and a researcher-developed phonological awareness task. Results show that, on average, children in the ECS sample performed below average in both English and Spanish when compared to monolingual norms and, despite some early literacy and oral language gains during their pre-kindergarten year, continue to lag behind monolingual children of the same age. Children in the ECS sample performed better in the early literacy tasks than in the oral language tasks in both English and Spanish. On average, the PRC sample scored significantly better than the ECS sample in Spanish oral language skills, but lower in phonological awareness skills. Educational implications and directions for future research are discussed.

Keywords

Bilingual children; Language development; Early childhood

1. Introduction

The United States is on its way “to universal, voluntary, preschool attendance, not as a result of government mandate or expert recommendation, but as a consequence of parental demand and a myriad of private, state, and federal initiatives that are continuing to extend early education throughout the country” (Bowman, Donovan, & Burns, 2001, p. 29). An increasing number of the children entering early childhood education settings, such as preschool, Head Start, and child care centers, are English language learners (i.e., children who do not speak English as their first language). A large percentage of these children are exposed to Spanish at home. This reflects current demographic and immigration patterns and the fact that 12% of the U. S. population self-identifies as Latino (Suárez-Orozco & Páez, 2002).

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This trend of increasing numbers of English language learners in early childhood education is exemplified by the population served by the Head Start program. Of the more than one million children who were enrolled in Head Start in 2001–02, one in four (264,000) spoke a language other than English at home (Edmondson, 2005). In 83 percent of these other-than-English speaking households, the home language was Spanish. The proportion of all Head Start children who hear Spanish at home has risen from 19% in 1998 to 22% in 2002 (Edmondson, 2005; Joseph & Cohen, 2000).

The increasing number of students in early childhood settings who come from homes where English is not the predominant language spoken present a challenge for educators who serve this population. The data reported in this article come from the Early Childhood Study of Language and Literacy Development of Spanish-speaking Children (ECS). This project was developed to answer some basic questions about this population of young English language learners. The purpose of the project is twofold: (a) to collect data longitudinally from pre-kindergarten to second grade for a group of young children from homes where Spanish is spoken, and (b) to identify factors related to the development of language and literacy skills in their two languages. In this article we report findings on the English and Spanish early literacy and oral language abilities of these children as they entered and exited pre-kindergarten programs.[3]

The focus on language and literacy skills is an important one given the growing consensus that early childhood is a critical time for language and literacy learning (Snow & Tabors, 1993). Research with monolingual children has shown that language experiences and early exposure to literacy are important precursors for children's language development and literacy acquisition (Snow, Burns, & Griffin, 1998; Dickinson & Tabors, 2001). The development of a group of literacy-related skills during the preschool years has been identified as important for later outcomes. We think of these skills as falling into two broad categories: (a) early literacy skills, expressed in phonological awareness, letter and word recognition, and writing and spelling skills; and (b) oral language abilities, expressed in vocabulary and language recall skills. Researchers who have studied precursors to literacy demonstrate that the skills in these two domains are foundational for monolingual children's ability to read and write (Dickinson & Snow, 1987; Lonigan, 2003; Storch & Whitehurst, 2002; Whitehurst & Lonigan, 1998).

This line of research has also demonstrated that there is considerable variability in emergent language and literacy skills, placing some children at risk for developing reading difficulties (Snow et al., 1998). Among the risk factors that have been identified, the effect of poverty on emergent literacy has been well documented. For example, research with monolingual Head Start children has shown that children from low-income families are at risk of later reading difficulties because of overall slower development of emergent literacy skills and the high degree of stability of these skills (Lonigan, 2003).

But what happens to young children who are learning two languages at the same time? It has been recognized that teaching children to read in a language in which they are not yet proficient may constitute an additional risk factor for reading difficulties (Snow et al., 1998). English language learners, including Spanish-speaking children, have been disproportionately represented among those who have difficulty in school with reading, mathematics and general educational attainment. Data from the National Assessment of Educational Progress (NAEP) for 2000 indicate that in the fourth, eighth and twelfth grade, Hispanic[4] students did not perform as well as White students. For example, whereas 27

[3]Michael Milburn, Ph.D. at the University of Massachusetts assisted with the statistical analyses for this paper. We are grateful for his comments and revisions to this manuscript.

percent of White fourth graders performed below the basic ability level in reading achievement, this figure was 58 percent for Hispanics. Moreover, while the average scores for eighth-grade students on the reading assessment of NAEP were higher in 2003 than in 1992, the average scores for Hispanic fourth graders did not show a similar increase (National Center for Education Statistics, 2003). The achievement gap between White students and Hispanic students at both fourth grade and eighth grade is not closing. This is an indication that a large proportion of students from Spanish-speaking homes are at risk for school failure.

In response to these concerns, current research with Spanish–English bilingual students has focused on vocabulary development (August, Carlo, Dressler, & Snow, 2005; Cobo-Lewis, Pearson, Eilers, & Umbel, 2002; Ordóñez, Carlo, Snow, & McLaughlin, 2002; Umbel, Pearson, Fernandez, & Oller, 1992), cross-linguistic transfer between English and Spanish (Dickinson, McCabe, Clark-Chiarelli, & Wolf, 2004; Gottardo, 2002; Lindsey, Manis, & Bailey, 2003), phonological processing and executive memory processes (Swanson, Sáez, Gerber, & Leafstedt, 2004), cross-language effects in predicting English reading skills (Manis, Lindsey, & Bailey, 2004), and the impact of sociocultural factors, including home literacy environments (Gouleta, 2004; Hammer, Miccio, & Wagstaff, 2003).

While these studies are increasing our knowledge of English–Spanish bilingual students, the majority have been conducted with early elementary students. Only two studies have reported bilingual preschoolers' language and literacy experiences (Dickinson et al., 2004; Hammer et al., 2003). Hammer et al. (2003) investigated the home literacy experiences and emergent literacy skills of 43 Puerto Rican children recruited from Head Start programs. They divided the sample based on whether the children had learned Spanish and English from birth (simultaneous learners) or Spanish from birth and English at Head Start (sequential learners). Their findings showed no differences between these groups in English emergent reading abilities at ages 3 and 4. Research by Dickinson et al. (2004) focused on phonological awareness of 123 Spanish–English bilingual preschool children attending Head Start and found that their phonological skills were stable across the preschool year and showed transfer across languages. These findings about transfer are consistent with previous work with grade school bilingual children (see Cummins, 1991, for review).

Given the paucity of studies of young bilingual children, we still lack a clear picture of what constitutes typical language and early literacy development for these children during the preschool period (McCardle, Mele-McCarthy, & Leos, 2005).

1.1. The present study

In this article, we report on the findings from the data collection period in the Early Childhood Study when the children attended pre-kindergarten programs. We compare findings from bilingual children in this study with a comparison sample of Spanish speaking children in Puerto Rico.

1.1.1. What are the early literacy and oral language skills in Spanish and English of a sample of young, bilingual children and how do these skills change during the pre-kindergarten year?—

We hypothesize that the sample of bilingual children will display below average English oral language and early literacy skills at Time 1 due to their lack of familiarity with English and their low-income status, but will make substantial gains during the pre-kindergarten year. We hypothesize that this sample

[4]We recognize that these statistics include children from homes where Spanish may not be the dominant language, but these statistics are the most relevant for this study.

will display higher Spanish oral language skills due to their home language experiences, but below average early literacy skills in Spanish at Time 1. We hypothesize that this sample will maintain or increase their Spanish oral language skills, but will not make gains in early literacy skills during the pre-kindergarten year as these skills are not supported, for the most part, in their classrooms.

1.1.2. What are the early literacy and oral language skills in Spanish of a monolingual, Spanish-speaking comparison sample in Puerto Rico and how do these skills change during the pre-kindergarten year?—We hypothesize that the comparison sample in Puerto Rico will display more advanced Spanish oral language and early literacy skills at both time periods, as they are being raised in monolingual Spanish-speaking environments and are attending Spanish-speaking classrooms.

1.1.3. How do the early literacy and oral language skills in Spanish of bilingual children compare to similar, monolingual, Spanish-speaking children in Puerto Rico?—We hypothesize that the Spanish-speaking children in the Puerto Rico sample will display a considerable advantage over the bilingual children's Spanish oral language and early literacy results. Given that these samples are similar in SES, differential results on these measures could be related to bilingual status.

2. Method

2.1. Participants

The children in the Early Childhood Study were recruited by contacting parents in Head Start and public preschool programs in three communities in Massachusetts (Boston, Framingham, and Lawrence[5]), and one community in Maryland (Montgomery County[6]). A comparative sample was recruited from similar Head Start programs in two communities in Puerto Rico (Loiza and Trujillo Alto[7]). All of the children were 4 years old at Time 1 and were age-qualified to attend kindergarten the following year. Additionally, the children in the sample in Massachusetts and Maryland were living in homes where Spanish was at least one of the languages spoken. The Massachusetts and Maryland participants represent our study group and are referred to as the Early Childhood Study (ECS) sample and the Puerto Rico participants are referred to as the Puerto Rican Comparative (PRC) sample.

2.1.1. Early Childhood Study (ECS) pre-kindergarten sample—The ECS sample consists of the 319 children who were assessed both in the fall of 2001 as they entered pre-kindergarten programs (Time 1) and in the spring of 2002 as they exited these programs (Time 2). The mean age for the ECS pre-kindergarten sample at Time 1 was 4.43 years and at Time 2 it was 4.97 years.

The majority of the ECS sample were born in the United States (84.4%), and 5.5% were born in the US territory of Puerto Rico. The remaining children were born in different countries in Latin America.[8] Although most of the children in the sample were born in the

[5]Cooperating partners in Boston for the pre-kindergarten year were Action for Boston Community Development (ABCD) Head Start and the East Boston Early Education Center, a Boston Public School. Cooperating partners in Framingham were the South Middlesex Opportunity Council (SMOC) Head Start and BLOCKS, a Framingham Public School pre-kindergarten program. The cooperating partner in Lawrence was the Greater Lawrence Community Action Council Head Start.

[6]Cooperating partners in Montgomery County for the pre-kindergarten year were Head Start of Montgomery County and the Extended Elementary Education Program of the Montgomery County Public Schools.

[7]The cooperating partner in Puerto Rico for the pre-kindergarten year was the Council for Preschool Children of Puerto Rico, Inc. Head Start.

[8]All family demographic information is derived from the parent survey that was administered by telephone or in person in the fall of 2001. Most of the interviews were done with the mothers of the participating children and lasted 15 to 20 minutes. Three hundred and eight of the 319 families in the matched ECS sample completed this interview.

US, their parents come from 22 countries in Latin America and the Caribbean, as well as the US territory of Puerto Rico. In all, 33% of the sample did not have a father or male figure present in the home.

The ECS sample are all dual language learners, ranging from children who have learned two languages simultaneously from infancy to children who are in the process of sequentially learning a second language (Genesee, Paradis, & Cargo, 2004). Given previous research findings of no differences in early literacy of these subgroups at this young age (e.g., Hammer et al., 2003), we consider them as one group with diverse dual language abilities based on their personal histories.

The ECS children come from a variety of family backgrounds in terms of language use at home, parental years of education, and family income. Participating families' language use at home varied considerably with 59% reporting that they use only Spanish, 22% use mostly Spanish, and 19% use some English at home. Levels of parental education range from 0 to 22 years. The average years of formal education for mothers (M = 10.95, SD = 3.75) and for fathers (M = 10.69, SD = 3.79) are similar (r = .51, $p < .001$). In terms of family annual income, 78% of the families in the sample report making less than $30,000 with 21% reporting they make less than $10,000 (see Páez & Tabors, in preparation, for further information about the impact of family circumstances on these children's dual language development).

The ECS children sample attended 68 pre-kindergarten classrooms, 58 of which were Head Start classrooms, with the remainder being preschool programs in public schools. English was the dominant classroom language for all except one all-Spanish classroom; however, 21 classrooms experienced varying levels of Spanish (see Tabors & Páez, in preparation, for further information about classroom factors).

2.1.2. Puerto Rican Comparative (PRC) pre-kindergarten sample—The Puerto Rican pre-kindergarten comparative sample (PRC) consists of 144 Spanish-speaking 4 year-old children living in Puerto Rico, who attended 16 Head Start classrooms during the study year. The sample was selected to be similar in age, gender, and socio-economic background to the ECS sample. The mean age for the PRC sample at Time 1 was 4.48 years and at Time 2 it was 4.97 years. Inclusion of the PRC sample enables us to determine expected Spanish performance levels for the ECS sample, and allows us to examine the effects of different language environments on the Spanish language and literacy development of the bilingual children in the ECS sample, because the children in Puerto Rico experience a Spanish-language environment at home and in pre-kindergarten.

Almost all the children in the PRC sample were born in Puerto Rico (96.4%). This is also true for the parents of participating children. Ninety-two percent of the mothers and 94% of the fathers were born in Puerto Rico; two mothers and one father were born in the Dominican Republic and the remaining parents were born in the mainland United States. Similar to the ECS sample, 33% of the sample does not have a father or male figure in the home.

The majority of the families reported using only Spanish in their home (84.7%). Mothers' years of education ranged from 3 to 18, while fathers' education ranged from 0 to 18 years. The average years of formal education for mothers (M = 12.15, SD = 2.56) was slightly higher than that for fathers (M = 11.48, SD = 2.66). Ninety-nine percent of the families reported an income of less than $30,000. Fifty-nine percent of the families reported an income of less than $10,000.

2.2. Instruments

The language and literacy battery used for this study is based on previous work on the language and literacy skills of young children (Snow, Tabors, Nicholson, & Kurland, 1995; Dickinson & Tabors, 2001), while taking into consideration three further criteria: (a) the need to have tasks in both Spanish and English, (b) the need to have as many instruments as possible that are of high reliability and validity, and (c) the need to have tasks that are appropriate for the age range (ages 4 to 7) under consideration. Table 1 displays the constructs and the instruments used to collect the data for these constructs[9].

2.2.1. The Phonological Awareness Task—We developed the Phonological Awareness Task specifically for this study, as we were unable to find any equivalent test that was available in Spanish and English that was appropriate across the needed age range.[10] There are five subtests: rhyme recognition, rhyme production, initial phoneme recognition, sentence segmenting, and syllable segmenting. There are two versions of the test, one in Spanish and one in English. These two versions tap the same skills, but have been constructed separately to demonstrate the children's phonological abilities in each of their languages. A full description of this task can be found in Tabors, Páez, and López (2003).

Rasch analyses indicated a reliability of .68 on the English version of the test and a reliability of .59 for the Spanish version. Rank order correlations indicated that each subtest contributes positively to the total score for both versions of the test; therefore, all subtests were retained in the measures. In order to determine the internal consistency, reliability analysis using Cronbach's alpha was calculated for each of the tests in each language at both time points. For the English assessment the 26 test items showed moderately high consistency at both time points (α =.81 and .86). For the Spanish assessments the 26 test items showed moderate consistency at both time points (α = .78 and .79). The internal reliability of this measure in both languages allows us to confidently proceed with the statistical analysis of this measure using mean scores (see López & Tabors, submitted for publication). As no norms have yet been developed for this measure, it is used descriptively to document individual children's growth in phonological awareness over time.

2.2.2. The Woodcock Language Proficiency Battery-Revised (WLPB-R)—The Woodcock Language Proficiency Battery-Revised is a standardized assessment consisting of a set of subtests used to measure different aspects of language and literacy skills. There are two versions of these tests, one in Spanish and one in English.

Standard scores for all of the WLPB-R subtests are normed on a mean of 100 and a standard deviation of 15. The English Form of the subtests was normed on a randomly selected population of 6359 English-speaking subjects in the United States. The sample was stratified and weighted so that the population is representative of the distribution and characteristics of the US population. Consequently, the norms for these assessments were developed from monolingual English-speaking children.

The Woodcock Language Proficiency Battery-Revised — Spanish Form (Woodcock & Muñoz-Sandoval, 1995)is parallel in content and structure to the English Form. The Spanish Form of the subtests was normed on 3,911 native Spanish-speaking subjects from both inside and outside the United States. Of these subjects, 116 were tested in Costa Rica, 1,512

[9]Other data collected at each time period but not reported here include a narrative production task and an emergent literacy task.
[10]This test is based on previous work by Lisa M. López, when she was at the University of Miami, David K. Dickinson, when he was at the Education Development Center, Andrea Rolla San Francisco, at the Harvard Graduate School of Education, and Adele Miccio, at Pennsylvania State University.

in Mexico, 196 in Peru, 634 in Puerto Rico, 128 in Spain, and 1325 in the United States. Although some of the participants used to provide norming data for these assessments lived in the US, these children were, by design, monolingual Spanish speakers (Woodcock & Muñoz-Sandoval, 1995). Consequently, the norms for these assessments were essentially developed from monolingual Spanish-speaking children. The reliability and validity characteristics of both forms of the WLPB-R meet basic technical requirements (see Woodcock, 1991b, p. 124).

When interpreting the results on these tests with this bilingual population it is important to note that we are comparing bilingual children to norms that have been developed for monolingual children. This is necessary because there are no tests measuring these skills that are normed on bilingual populations. In addition, a current review of the literature by NIH and the U.S. Department of Education noted that "a comparison group of English-speaking monolinguals is not always the optimal comparison group for bilingual individuals; however, for purposes of studying English language learners students in the U.S. education system including such comparisons can be important" (McCardle et al., 2005, p. 70).

Further, when comparisons are made over time, the comparisons are being made on the standard score, taking into account the age of the child and the gains that would be expected for a monolingual child from one time to the next. Therefore, any gains that are demonstrated on these tests are *above and beyond* the expected.

The four subtests used in this study from the WLPB-R included Letter-Word Identification (Identificación de Letras y Palabras), Dictation (Dictado), Picture Vocabulary (Vocabulario Sobre Dibujos), and Memory for Sentences (Memoria para Frases).

The Letter-Word Identification subtest first measures symbolic learning through the use of rebuses (i.e., a representation of words by means of pictures), followed by identification of letters and then word decoding. This test was used in the present study to index children's letter and word recognition abilities.

The first items in the Dictation subtest measure children's pre-writing skills, followed by items measuring their knowledge of letter forms, spelling, punctuation, capitalization, and word usage. This test was used in the present study to index children's writing and spelling skills.

In the Picture Vocabulary subtest children are asked to select pictures to match words and to say a word when shown a picture. Although a child's receptive vocabulary skills are measured at the beginning of this test, this is primarily an expressive vocabulary task. This test was used in the present study to index children's vocabulary.

In Memory for Sentences children are asked to repeat words, phrases, and then whole sentences. This subtest requires the use of both short-term memory and ability to extract meaning from the sentences in order to aid recall. This test was used in the present study to index children's language recall skills.

2.3. Procedure

Assessment sessions were conducted one-on-one at the school sites and lasted approximately 45 minutes During the assessment session, children were allowed to discontinue the testing situation at any time. In the ECS sample, children were assessed twice, once in English and once in Spanish, at two time points: in the fall of 2001 as they started their preschool programs (Time 1) and in the spring of 2002 as they completed their

preschool year (Time 2). There was an average of six months between data collection periods.

To make children in the ECS sample as comfortable as possible with the testing situation at Time 1, they were assessed in their stronger language first and then in the other language. Their stronger language was determined by asking parents on the consent forms what language they thought their children knew best. Sixty-three percent of the children were first tested in Spanish. The children who were tested first in Spanish were tested in English an average of 12 days later. The children who were tested first in English were tested in Spanish an average of 15 days later. At Time 2, order of assessments in English or Spanish was not specified.

For the ECS sample, there were two teams of assessors, one for each language. The assessors received extensive training on administering the assessment battery. Prior to assessing a child, the assessor spent some time in the classroom getting to know the child. Assessors spoke only in the language of the assessment during both the warm-up sessions in the classroom and the assessment sessions. These procedures – having separate language teams and using only the language of the assessment – were used to minimize code-switching during testing sessions.

Procedures and timing for the PRC sample were similar, although the children were assessed only in Spanish at both Time 1 and Time 2.

2.4. Data analysis

As a first step, we calculated measures of central tendency and variance for the total scores of the Phonological Awareness Task and the standardized scores for each of the subtests of the WLPB-R[11]. These analyses were done for the two waves of assessment data in both languages for the ECS sample and in Spanish for the PRC sample.

Because there are five primary outcome variables in this study, the Phonological Awareness task and the four language subtests, an initial MANOVA was done to control for family-wise error (Keppel, 1991). In this analysis there were two within-participants factors, each with two levels: TIME (Time 1, Time 2) and LANGUAGE (English, Spanish). In addition, because the language spoken at home by participants' mothers varied considerably, from some English to all Spanish, a between-participants variable, MOTHLANG, with three levels, (1) only Spanish (n = 163); (2) mostly Spanish (n = 60); (3) 50% or more English (n = 52), was also included in the model.

The multivariate F for the 3-way interaction, TIME by LANGUAGE by MOTHLANG was not significant ($F(10,538) = .628$, $p = .79$). This result indicates that the pattern of changes over time in language development for English and Spanish are not significantly different, regardless of how much English or Spanish a child's mother speaks in the home.

A second MANOVA was calculated, including just the two within-participants factors, TIME and LANGUAGE. We also tested for differences between English and Spanish skills over time by including an interaction term between TIME and LANGUAGE. To clarify the effects in each significant univariate ANOVA, two paired-sample t-tests within the ECS sample were calculated, testing the significance of the changes over time separately for English and Spanish. Since for each significant F there are two t-tests, a Bonferroni correction requires using a p-value of .025 rather than .05. In addition, the value of Cohen's

[11]Raw scores for each of the subtests were converted into standard scores using the Woodcock Compuscore and Program Profiles software program.

d was calculated to determine the effect sizes of these comparisons, using the means and standard deviations for the total raw scores of the Phonological Awareness Task and the standardized scores of the WLPB-R subtests in each language.

To explore the differences in performance in Spanish between the ECS sample and the PRC sample, an additional MANOVA was computed, with SITE (ECS, PRC) as a between-participants factor, and TIME (Time 1, Time 2) as a within-participants factor, testing effects on the five language development variables. Independent samples *t*-tests were then computed to clarify the differences between the ECS and PRC samples at each time, and paired-samples *t*-tests were used to test the over-time differences within the PRC sample. Effect sizes of these comparisons were determined by computing the value of Cohen's *d* using the *t*-test value and the degrees of freedom generated by the independent-samples *t*-tests. Since three *t*-tests were computed for each dependent variable, a Bonferroni correction indicated that a *p*-value of .016 should be used to keep the actual Type I error at $p < .05$. Additionally, Levene's test of homogeneity was used in testing for possible violations of homogeneity of variance.

3. Results

The means, standard deviations, and ranges of the scores for the Phonological Awareness Task and each of the four subtests of the WLPB-R administered to the ECS and the PRC samples are presented in Table 2. The Phonological Awareness Task, Letter-Word Recognition, and Dictation are considered the early literacy tests. Picture Vocabulary and Memory for Sentences are considered the oral language tests. Results for Time 1 and Time 2 are presented in English and Spanish for the ECS sample and in Spanish for the PRC sample.

3.1. Descriptive results for the ECS and PRC samples: Time 1 and 2

Results from the MANOVA analysis showed significant differences between testing times for both English and Spanish skills. Each of the five univariate Fs was significant: for Phonological Awareness, $F_{(1, 284)} = 8.6$, $p = .004$, for Picture Vocabulary, $F_{(1, 284)} = 34.8$, $p < .001$; for Letter-Word ID, $F_{(1, 284)} = 45.1$, $p < .001$; for Dictation, $F_{(1, 284)} = 11.7$, $p = .001$; for Memory for Sentences, $F_{(1, 284)} = 5.7$, $p = .018$. In addition, the multivariate *F* for the TIME by LANG interaction was significant ($F_{(5, 280)} = 19.3$, $p < .001$). Thus, these results indicate that the pattern of language development over time was different for English and Spanish across all five language measures. These patterns are discussed in detail below and are shown in Figs. 1-5.

3.1.1. Early literacy

3.1.1.1. Phonological awareness: When the Phonological Awareness Task was administered at Time 1 it was found to be quite difficult for the children in the study. The highest possible total score for this test is 26. The highest score achieved by bilingual children in the ECS sample was 19 in English and 16 in Spanish, and for the monolingual Spanish-speaking children in the PRC sample the highest score achieved was 12. At Time 2, children in both the ECS and PRC sample had made gains on this task with the ECS sample achieving a high score of 23 in both Spanish and English and the PRC sample achieving a high score of 18. Hypothesis testing[12] indicates medium gains in phonological awareness skills from Time 1 to Time 2 for the ECS sample in English ($t(305) = -10.1$, $p < .001$; $d = .$

[12]Throughout the results section, effect sizes are reported for hypothesis tests using the set of conventions defined by Cohen (1988): *small* equals .20, *medium* equals .50, and large equals .80. These effect sizes are useful in gauging the results of hypothesis testing with a large sample size such as the one presented in this study.

55) and large gains in Spanish ($t(308) = -14.3$, $p < .001$; $d = .90$). Medium gains were also attained in Spanish by the PRC sample ($t(143) = -4.97$, $p < .001$; $d = .53$).

3.1.1.2. Letter and word recognition: In the Letter-Word Identification subtest children in the ECS sample in English and Spanish performed, on average, within one standard deviation of the monolingual population means at Time 1. There were no significant differences between the ECS sample English scores at Time 1 and at Time 2. However, in Spanish the bilingual children's mean performance was moderately lower at Time 2 indicating that they did not make age-appropriate gains in this language ($t(315) = 8.417$, $p < .001$; $d = 0.40$).

The PRC sample performed, on average, slightly less than one standard deviation below the monolingual Spanish population mean at Time 1 and exactly one standard deviation below the mean at Time 2. The children in the PRC sample were not making age-appropriate gains in these Spanish skills as reflected by their slightly lower mean scores at Time 2 when compared to Time 1 ($t(144) = 3.48$, $p < .01$; $d = 0.30$).

3.1.1.3. Writing and spelling: In the Dictation subtest, the bilingual children in the ECS sample performed, on average, within one standard deviation of the population mean in both languages at both times. In English, the ECS sample made small gains from Time 1 to Time 2 ($t(309) = -4.12$, $p < .001$; $d = 0.21$), while no significant differences were found for their Spanish scores. The PRC sample mean was also within one standard deviation of the monolingual Spanish population mean at both testing times and these children showed a small gain from Time 1 to Time 2 ($t(144) = -3.35$, $p < .01$; $d = 0.29$).

3.1.2. Oral language

3.1.2.1. Vocabulary: In comparing the mean performance of the children in the ECS sample to the means of the monolingual norming population on the Picture Vocabulary subtest, the bilingual children in the ECS sample performed, on average, two standard deviations below the population mean in English at Time 1 and at Time 2. Even though children in the ECS sample made small gains in their English vocabulary over this time period ($t(310) = -3.93$, $p < .001$; $d = 0.12$), they were still well below average based on the normative scores. The ECS sample performed, on average, more than two standard deviations below the population mean in Spanish vocabulary skills as well. In addition, this gap increased slightly as they failed to make age-appropriate gains from Time 1 to Time 2 ($t(315) = 4.94$, $p < .001$; $d = 0.18$).

The monolingual Spanish-speaking children in the PRC sample performed one standard deviation below the population mean in Spanish at Time 1. Their Spanish vocabulary scores showed small gains between Time 1 and Time 2($t(144) = -3.54$, $p < .01$; $d = 0.23$), but continued to be below average.

3.1.2.2. Language recall: Similar results were found on another oral language task, Memory for Sentences, in which the bilingual children in the ECS sample performed, on average, close to two standard deviations below the population mean in both English and Spanish at Time 1. On average, their performances on this task showed small gains at Time 2 for English ($t(303) = -5.63$, $p < .001$; $d = 0.24$) and for Spanish ($t(301) = -2.36$, $p < .05$; $d = 0.12$). However, despite these gains, children's performance at Time 2 was also below average with the English mean falling one and half standard deviations below the monolingual mean, and the Spanish mean remaining close to two standard deviations below the monolingual mean.

The children in the PRC sample performed, on average, one standard deviation below the population mean on the Spanish Memory for Sentences at Time 1. Medium gains were made by this sample on the Spanish Memory for Sentences from Time 1 to Time 2 ($t(143) = -4.04$, $p < .001$; $d = 0.30$).

3.2. Cross-language results for the ECS sample: Time 1 and 2

Paired-samples *t*-tests were used to compare the bilingual children in the ECS sample against themselves with regard to performances in English and Spanish. This comparison is more than an academic question, as many decisions are made concerning the classroom placement of bilingual students based on their relative proficiency in their two languages. This analysis expands the definition of proficiency to include a wider range of skills than is usually examined for placement purposes.

3.2.1. Early literacy—On the Phonological Awareness Task, paired-sample *t* tests indicated no cross-language difference on the total scores for the ECS sample at Time 1. However a small difference was found between the scores at Time 2 ($t(311) = -3.15$, $p < .01$; $d = .18$) in favor of the Spanish scores. This indicates that the bilingual children in the ECS sample showed stronger phonological awareness skills in Spanish than English at the end of their pre-kindergarten year.

At Time 1, the bilingual children in the ECS sample performed slightly better in English on Letter-Word Identification ($t(306) = 4.01$, $p < .001$; $d = 0.23$), and slightly better in Spanish on Dictation ($t(305) = 2.84$, $p < .01$; $d = 0.17$). At Time 2, the ECS sample performed moderately better in English in Letter-Word Identification ($t(314) = 9.23$, $p < .001$; $d = 0.50$); however, the difference found at Time 1 in Dictation in Spanish was no longer significant at Time 2. This indicates that by the end of their pre-kindergarten year, the bilingual children in the ECS sample, on average, had stronger letter and word recognition skills in English, and equivalent skills in English and Spanish on writing and spelling.

3.2.2. Oral language—The paired-samples *t*-test comparing the bilingual children in the ECS sample against themselves with regard to performances in English and Spanish showed, on average, no significant differences between English and Spanish Picture Vocabulary scores at Time 1, and a slightly better performance in English on Memory for Sentences ($t(294) = 2.60$, $p < .05$; $d = 0.18$). At Time 2, medium mean differences between English and Spanish were found in English in both Picture Vocabulary ($t(315) = 2.84$, $p < .001$; $d = 0.46$) and Memory for Sentences ($t(305) = 5.05$, $p < .001$; $d = 0.34$). This indicates that by the end of the pre-kindergarten year, the bilingual ECS sample, on average, had stronger oral language skills in English than in Spanish.

3.3. Within-language results for the ECS and PRC samples: Time 1 and Time 2

Results from the MANOVA analysis demonstrated differences in performance in Spanish between the ECS and the PRC samples. Both the multivariate *F*s for the effect of TIME ($F_{(5, 435)} = 52.4$, $p < .001$) and the TIME by SITE interaction ($F_{(5, 435)} = 9.48$, $p < .001$) were significant. Examining the univariate ANOVAs for the five dependent variables, the TIME by SITE interactions were significant for Phonological Awareness ($F_{(1, 439)} = 12.86$, $p < .001$), Picture Vocabulary ($F_{(1, 439)} = 26.6$, $p < .001$), and Dictation ($F_{(1, 439)} = 52.4$, $p < .001$). The interaction effect for Memory for Sentences approached significance ($F_{(1, 439)} = 52.4$, $p < .084$), and the effect for Letter Word ID was not significant ($F_{(1, 439)} = .388$, *ns*). Graphs of these interactions are presented in Figs. 6-10. Independent samples *t*-tests were used to specify the differences in Spanish performance between the bilingual children in the ECS sample and the monolingual Spanish-speaking children in the PRC sample. These

comparisons make it possible to think about factors that might explain differences above and beyond the low-income status of both samples.

3.3.1. Early literacy—Independent samples *t*-tests indicated no difference on the total scores on the Phonological Awareness Task in Spanish between the ECS and the PRC samples at Time 1, and large differences at Time 2 ($t(456) = 4.95$, $p < .001$; $d = .51$) in favor of the ECS sample. Children in the ECS sample were, therefore, showing stronger phonological awareness skills in Spanish at the end of pre-kindergarten than children in the PRC sample.

After corrections for violations of assumption of equal variances on Dictation, no significant differences were found for Dictation at Time 1 or Time 2. Similarly, no differences were found at either time for Letter-Word Identification. By the end of pre-kindergarten, therefore, on average, the children in the two samples showed equivalent skills in Spanish on these tests of writing and spelling, and letter and word recognition.

3.3.2. Oral language—After corrections for violations of assumption of equal variances for Picture Vocabulary, a large difference was identified at Time 1 with the monolingual Spanish-speaking children in the PRC sample performing considerably higher on both of the two oral language subtests, Picture Vocabulary ($t(401) = -14.48$, $p < .001$; $d = 1.34$) and Memory for Sentences ($t(447) = -8.10$, $p < .001$; $d = 0.82$). After corrections for violations of assumption of equal variances were considered for both Picture Vocabulary and Memory for Sentences at Time 2, children of the PRC sample continued to perform considerably higher in Spanish than the ECS sample in Picture Vocabulary ($t(380) = -16.16$, $p < .001$; $d = 1.52$) and Memory for Sentences ($t(357) = -11.68$, $p < .001$; $d = 1.12$). By the end of pre-kindergarten, therefore, the monolingual Spanish-speaking children in the PRC sample were showed greater skills in Spanish on these tests of vocabulary and language recall.

4. Discussion

The primary purpose of this data collection period of the Early Childhood Study of Language and Literacy Development of Spanish-speaking Children was to establish baseline information about these young children's oral language and early literacy skills as they entered pre-kindergarten programs and to examine what happened to their skills over the course of a pre-kindergarten year. The ECS sample provided this information for both Spanish and English, and the PRC sample for Spanish. Using the battery developed for this research, we assessed children's early literacy skills – phonological awareness (as measured by the Phonological Awareness Task), letter and word recognition skills (as measured by Letter-Word Identification), and writing and spelling skills (as measured by Dictation), as well as their oral language skills – vocabulary (as measured by Picture Vocabulary) and language recalling skills (as measured by Memory for Sentences). A summary discussion follows.

4.1. Early literacy

By the end of pre-kindergarten, the bilingual children in the ECS sample were performing more strongly in Spanish than English on the Phonological Awareness Task. López and Greenfield (2004) show that oral proficiency in Spanish plays a significant role in the acquisition of Spanish phonological awareness, while Spanish phonological awareness and English oral proficiency positively influence English phonological awareness. This may indicate that although the children in the ECS sample are being taught school-related skills in English, they are applying their language skills in Spanish to this task. Once these children have mastered both phonological awareness in Spanish and English language

proficiency, it is expected that they will show significant gains in the English Phonological Awareness Task (López & Greenfield, 2004).

The results indicating that children in the ECS sample perform significantly better on the Spanish Phonological Awareness Task than the PRC sample may be a function of the lack of instruction in phonological awareness in Head Start classrooms in Puerto Rico, as research has indicated that phonological awareness is learned through instruction (McCormick, Kerr, Mason, & Gruendel, 1992).

Results from the Letter-Word Identification and Dictation subtests indicate that the bilingual children in the ECS sample score below average at the beginning of their pre-kindergarten year when compared to the monolingual norms for English- and Spanish-speaking children. Although we hypothesized that these children would make substantial gains in English early literacy skills during the year, they do not make large gains in English in letter and word recognition or spelling and writing, and in the case of Letter-Word Identification, they fall further below the norm in Spanish. Already at the beginning of pre-kindergarten, when individual bilingual children's English and Spanish scores are compared to each other, their English scores are slightly better; by the end of pre-kindergarten there is a considerable difference in these scores in favor of English, partially accounted for by their loss of skill in Spanish.

When we compare these results with findings from studies with elementary grade Spanish-speaking students, we find a similar profile for emergent literacy skills of Spanish-speaking students. Similar to our early literacy findings with preschoolers, Lindsey et al. (2003) found that 249 Spanish-speaking English-language learners' Spanish letter-word identification scores were below average at the outset of kindergarten, while their English letter-word identification scores at the end of first grade were within the average range for monolingual students.

In contrast to our findings that the bilingual children in our sample failed to make age-appropriate gains in Spanish during the preschool year, Lindsey et al. found that children's Spanish letter-word identification skills moved into the average range by the end of kindergarten and were well above average at the end of first grade. However, Lindsey's sample of bilingual students attended a Spanish language reading program and were not transitioned into an English language program until mid-first grade. This educational context is different from the language program for our sample, who were mostly in English language classrooms. Indeed, the literacy environment and instruction in preschool classrooms is an important factor to consider when examining the early literacy skills of these bilingual children. Future data collection and analysis for our study will examine the relationship between children's language and early literacy skills and their classroom environments.

4.2. Oral language

The vocabulary scores for the bilingual children in the ECS sample are more than two standard deviations below monolingual norms in both Spanish and English, and, despite a small gain in English vocabulary (and a decline in age-appropriate scores in Spanish), their scores remain essentially at this level at the end of pre-kindergarten. Here again the substantial gains in English that we hypothesized were not supported. Further, the initial level of their Spanish vocabulary skills was not higher than their English vocabulary skills as we had hypothesized, and the maintenance or gain in their Spanish oral language skills was not evident during the pre-kindergarten year.

There is a marked contrast when the Spanish vocabulary scores for the ECS sample are compared to the monolingual Spanish-speaking children in the PRC sample. The PRC

sample scored one standard deviation below the mean in Spanish vocabulary at the beginning of pre-kindergarten, and made a small gain during the pre-kindergarten year. The differences between the scores for the ECS sample and the PRC sample are large at both time points, confirming our hypothesis that exposure to Spanish at home and in the classroom makes a considerable difference for this group of young children in Puerto Rico.

The results on Memory for Sentences for the bilingual children of the ECS sample closely mirror the results for vocabulary, starting nearly two standard deviations below the monolingual mean in both English and Spanish, but making small gains in English and, unlike vocabulary, making small gains in Spanish as well. Again, the monolingual, Spanish-speakers in the PRC sample score closer to one standard deviation below the mean in Spanish vocabulary, and, again, the differences between the ECS sample and PRC sample scores are large at both time points.

Given that these children are young English-language learners, it is, perhaps, not surprising that they scored, on average, considerably below the norm in the oral language subtests in English when compared to English monolingual children. However, although our hypothesis was that they would have higher Spanish oral language scores, they also scored, on average, considerably below the norm in the oral language subtests in Spanish, including losing ground in Spanish vocabulary during the pre-kindergarten year. These results may well point to the vulnerability of young bilingual children to language loss in the context of acquiring a societal language as their second language.

In the study of young bilingual children mentioned previously (Lindsey et al., 2003) kindergarten children's oral language skills in Spanish were also found to be well below monolingual norms. By the end of first grade, these children's median English oral language skills were at the 2nd percentile for Memory for Sentences and below the 1st percentile for Picture Vocabulary. These extremely low levels of English oral language skills persisted through second grade when this sample was followed longitudinally by Manis et al. (2004).

However, findings by Cobo-Lewis et al. (2002) and Umbel et al. (1992) among grade school bilingual children in Miami show a different longitudinal profile. Umbel et al. (1992) studied 105 Hispanic bilingual first-graders of middle to high socioeconomic status. They found those bilingual children's vocabulary skills were significantly below the mean of the norming sample in English even with the higher socioeconomic status. Cobo-Lewis et al. (2002) reported longitudinal findings for the same sample of bilingual children in Miami and reported that the vocabulary gap between bilingual and monolingual students did not close until fifth grade.

These longitudinal studies are important in that they highlight how bilingual children's language skills can grow over time and, under certain circumstances, eventually catch-up with monolinguals (Cobo-Lewis et al., 2002). However, recent studies with lower SES children have shown that the gaps in oral language abilities might continue through the early elementary years when children are immersed in the learning to read process. A recent review of research in this area notes the importance of fostering oral language skills for these children (August & Shanahan, 2006). Thus, more longitudinal research is needed to determine the long term language and literacy outcomes of bilingual students.

Future research on this sample will track how their dual oral language and early literacy skills develop over time from pre-kindergarten to second grade and how their growth trajectories vary systematically as a function of selected contextual variables, such as characteristics of the individual children, language background, and language experiences at home and at school.

4.3. Summary

The bilingual ECS sample, on average, scores better on early literacy skills than on oral language skills in both languages, even though their early literacy skills are still below monolingual means for children their age. Already at age 4, these children demonstrate that the skills they do have are stronger in English than in Spanish, except for phonological awareness. Our findings reiterate previous studies that have demonstrated the limited oral language skills of bilingual students. The most novel result is our finding that this skill difference is manifested at the preschool level. In addition, this is the first study to compare the performance of a comparative group of low-income monolingual Spanish speakers, which adds strength to our interpretation and understanding of bilingual students.

The comparison of results for the ECS and PRC samples in Spanish is important because it means that something other than family background and low socio-economic status may be at play in these children's language learning process. Perhaps the PRC sample has an advantage over the ECS sample on oral language skills because these children are learning only one language – Spanish – in the context of a Spanish-speaking community. It might be that because the children in the ECS sample have to divide their abilities across two languages, their performances on these two oral language tasks in Spanish are impacted by their bilingualism.

4.4. Educational implications and directions for future research

Findings from this study present important educational implications and directions for future research on the development of early literacy and oral language skills of bilingual children. Our findings that bilingual children have lower oral language skills in English and Spanish as they enter pre-kindergarten classrooms and that there are only limited gains made in English means that preschool educators need to focus on developing bilingual children's oral language skills during instruction and language-focused activities, and need to concentrate on early literacy skills. Further, the failure to make expected gains in early literacy and oral language skills in Spanish, except in phonological awareness, means that there will not be an opportunity for children to learn these skills in their first language and then transfer them to English.

The fact that our sample is from a low-income background further stresses the need for powerful interventions at this level to increase language skills and reduce the risk for later reading difficulties. There are clear links between oral language skills, such as vocabulary, and children's reading development (Lonigan, 2003). National research reports, such as The National Research Council (Snow et al., 1998) and the National Reading Panel (NICHD 200), have noted the critical importance of vocabulary in reading instruction. More recently, oral language skills have also been found to be critically important for English language learners (August & Shanahan, 2006). Thus, focusing on children's oral language abilities will ensure that bilingual children arrive at school ready to benefit from the reading instruction they will receive.

Acknowledgments

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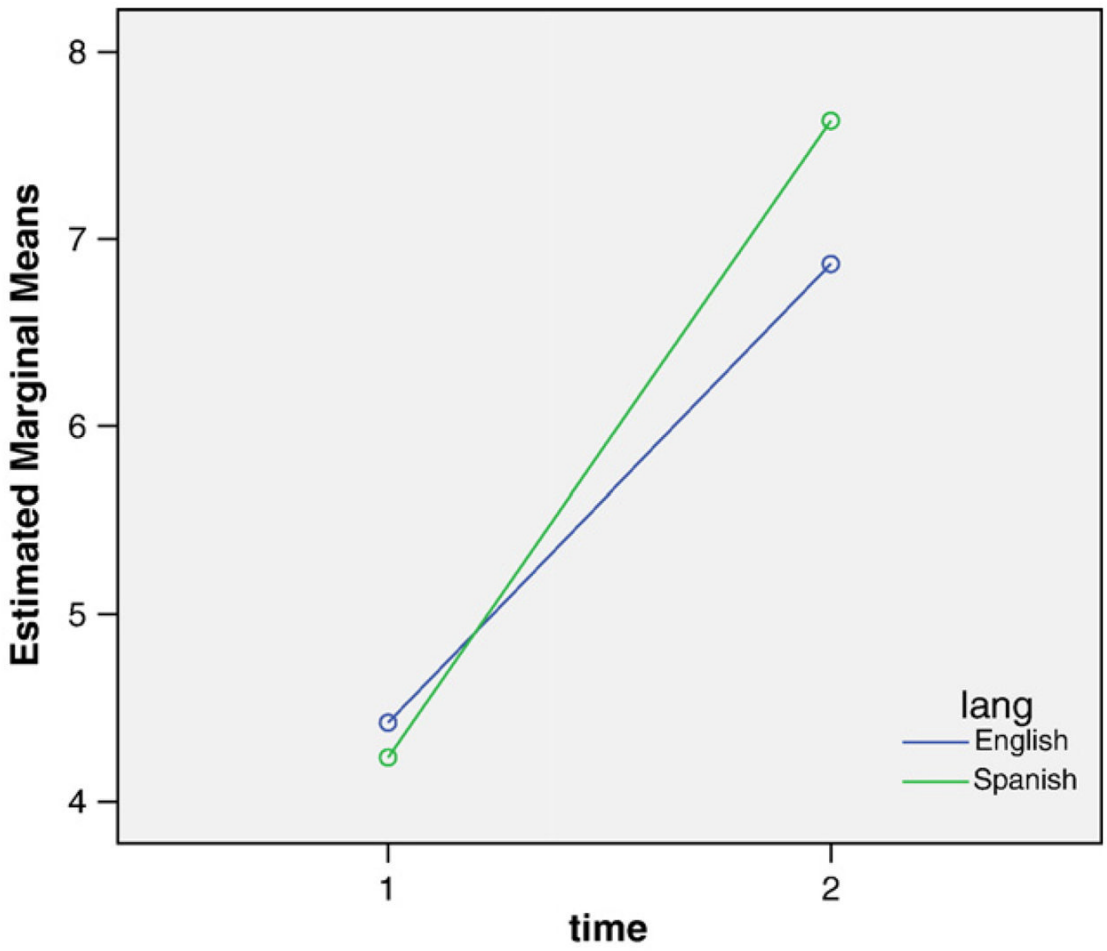

Fig. 1.
Estimated marginal means of phonological awareness.

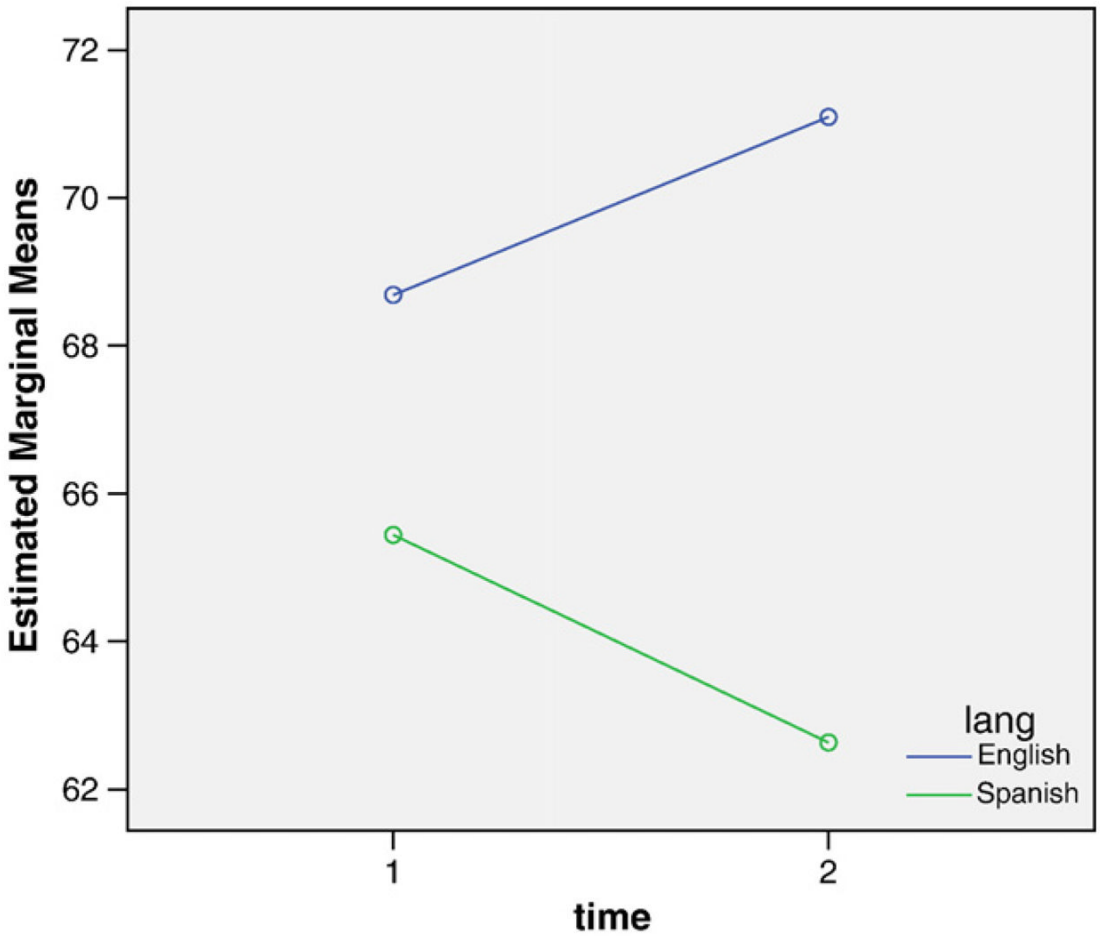

Fig. 2.
Estimated marginal means of picture vocabulary.

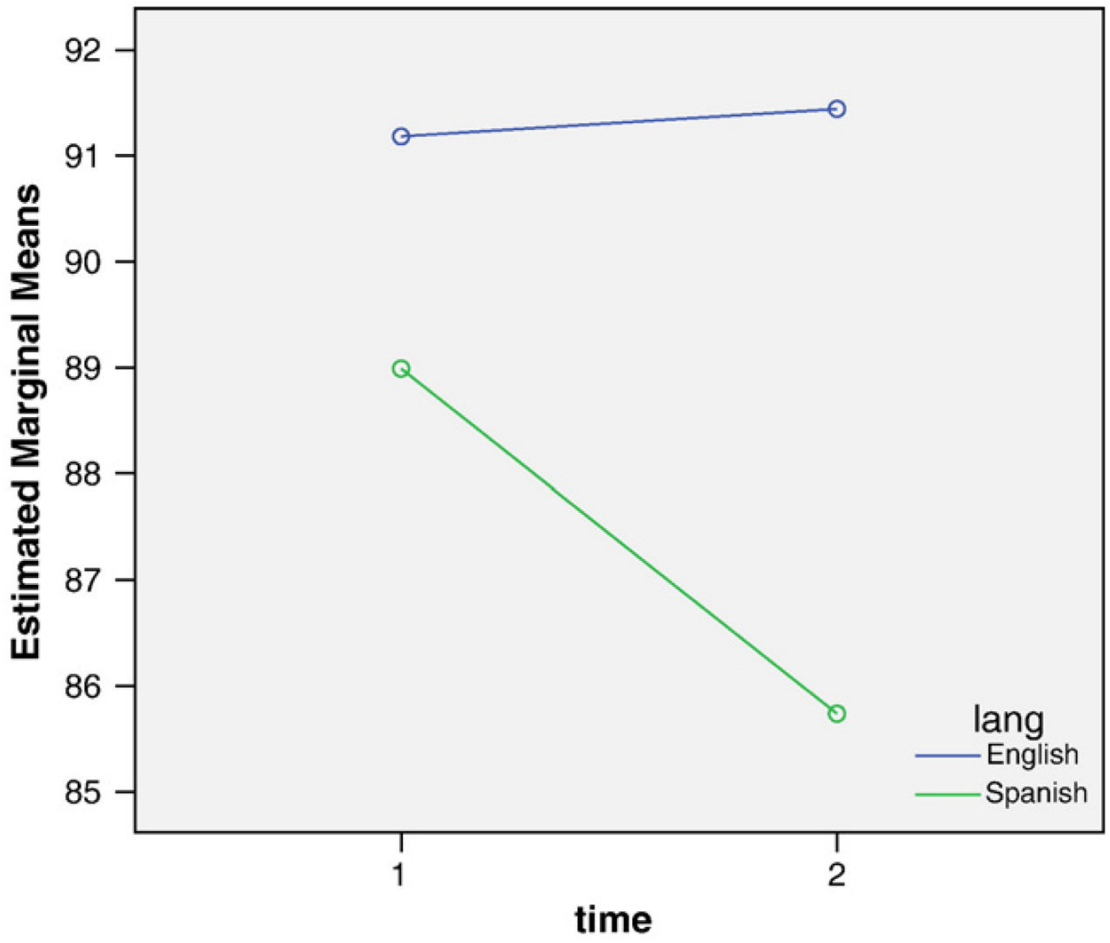

Fig. 3.
Estimated marginal means of letter word ID.

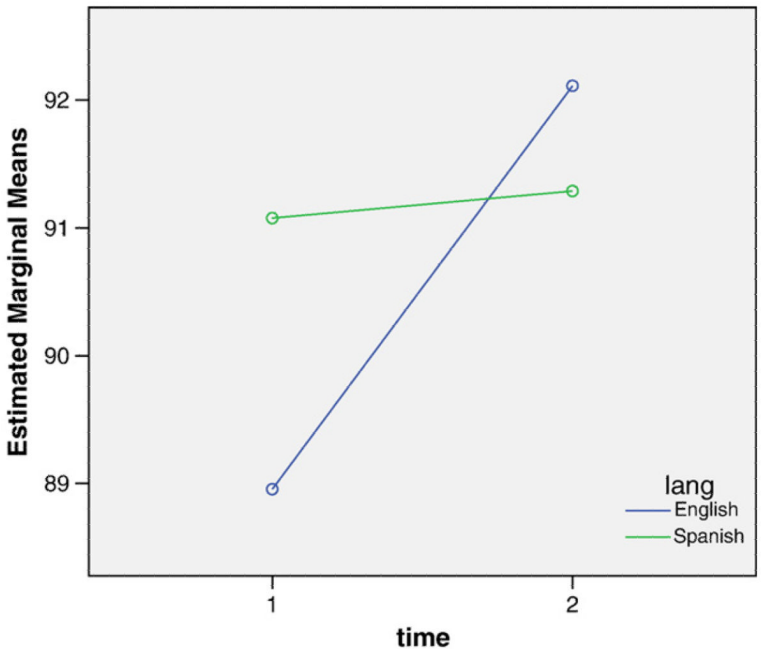

Fig. 4.
Estimated marginal means of dictation.

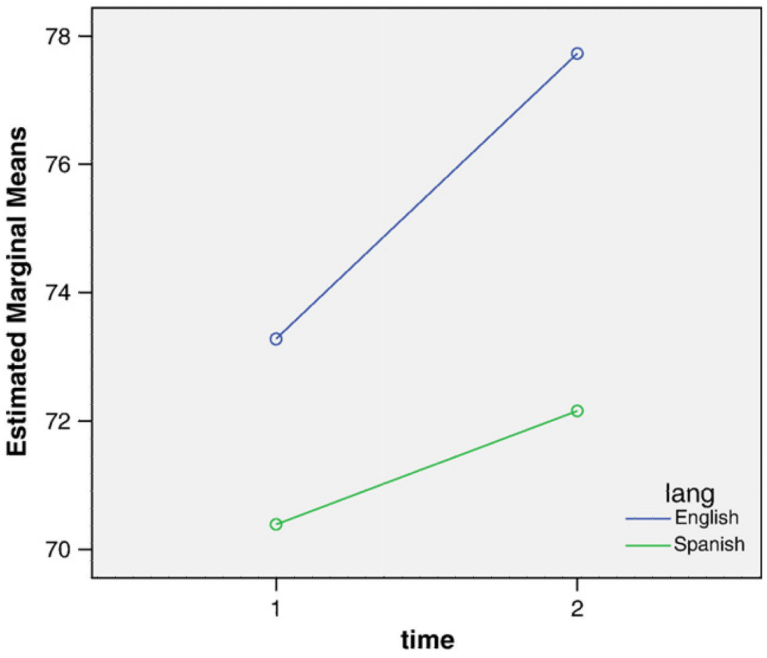

Fig. 5.
Estimated marginal means of memory for sentences.

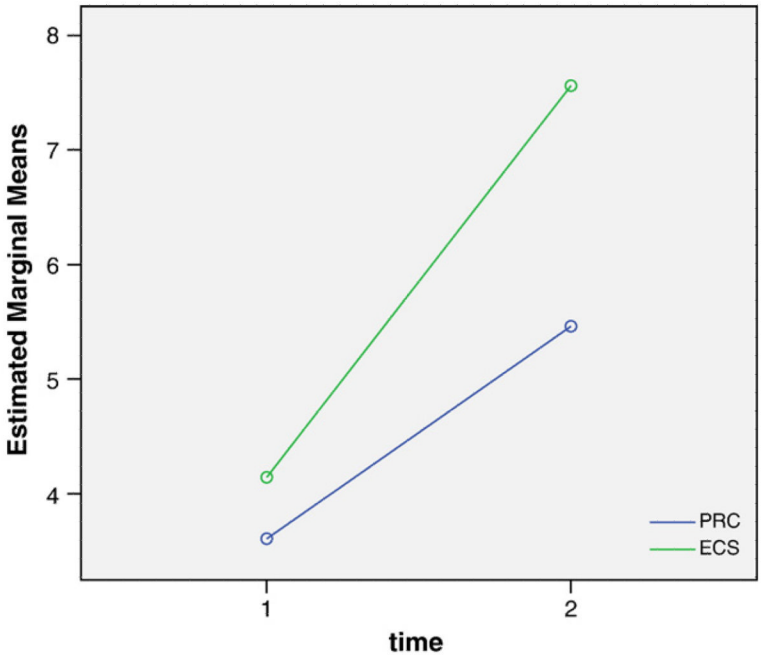

Fig. 6.
Estimated marginal means of phonological awareness.

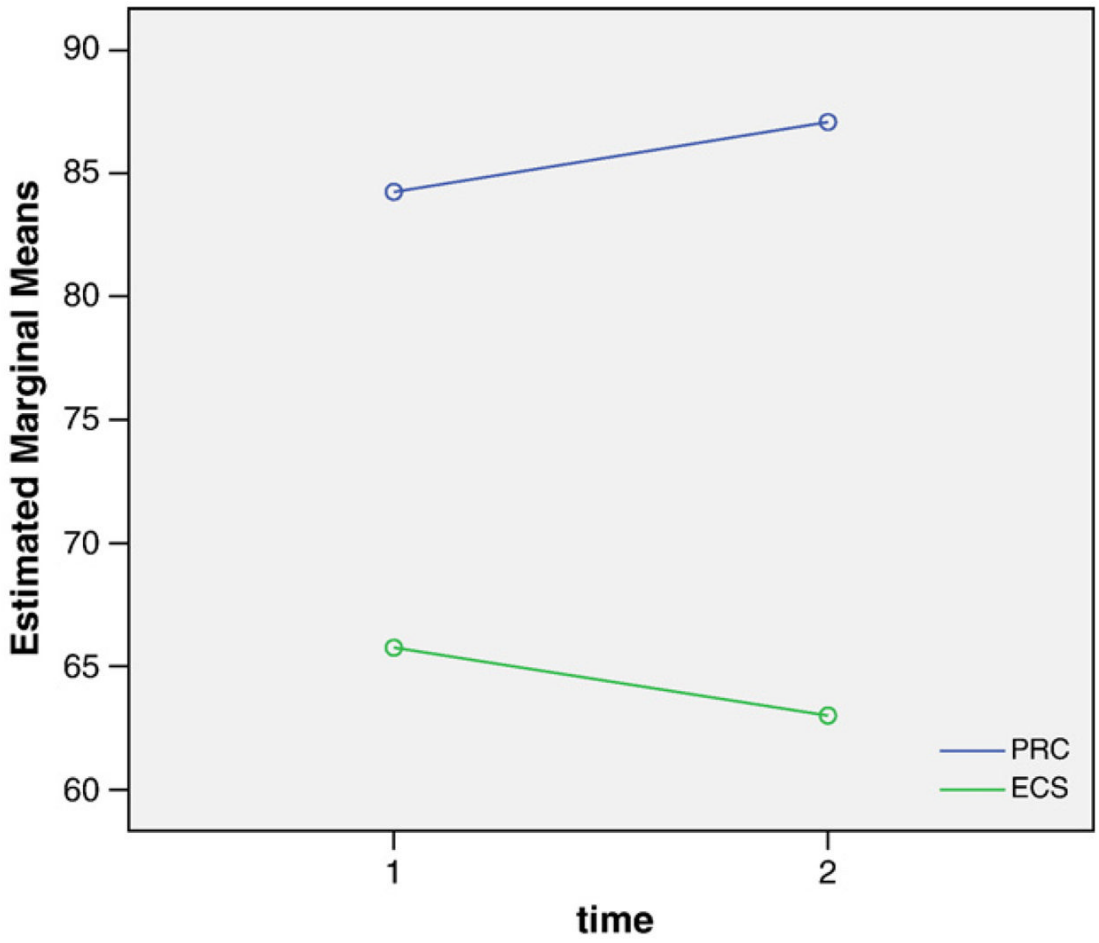

Fig. 7.
Estimated marginal means of picture vocabulary.

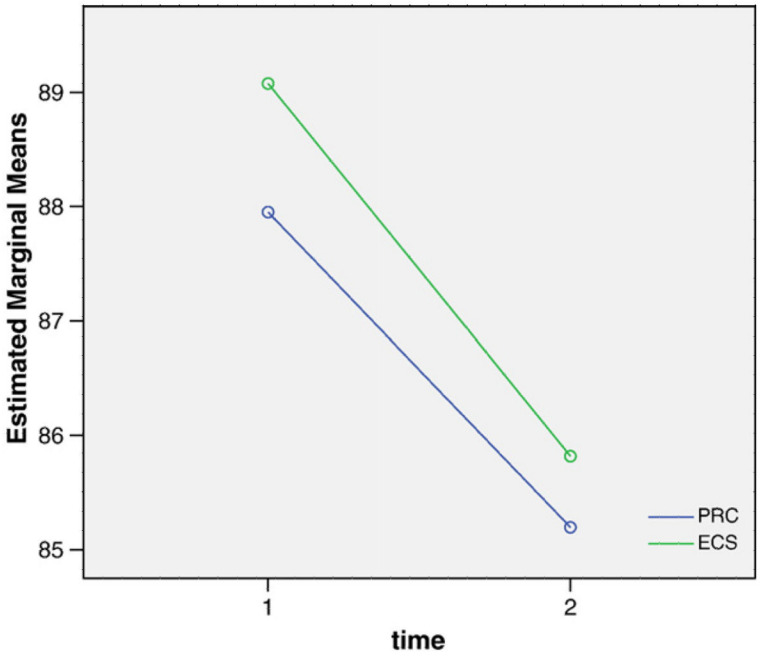

Fig. 8.
Estimated marginal means of letter word ID.

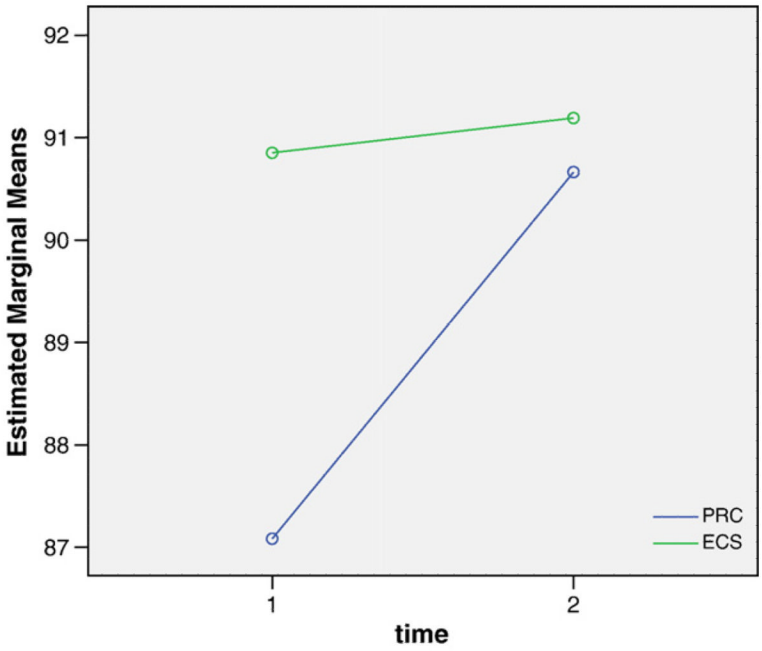

Fig. 9.
Estimated marginal means of dictation.

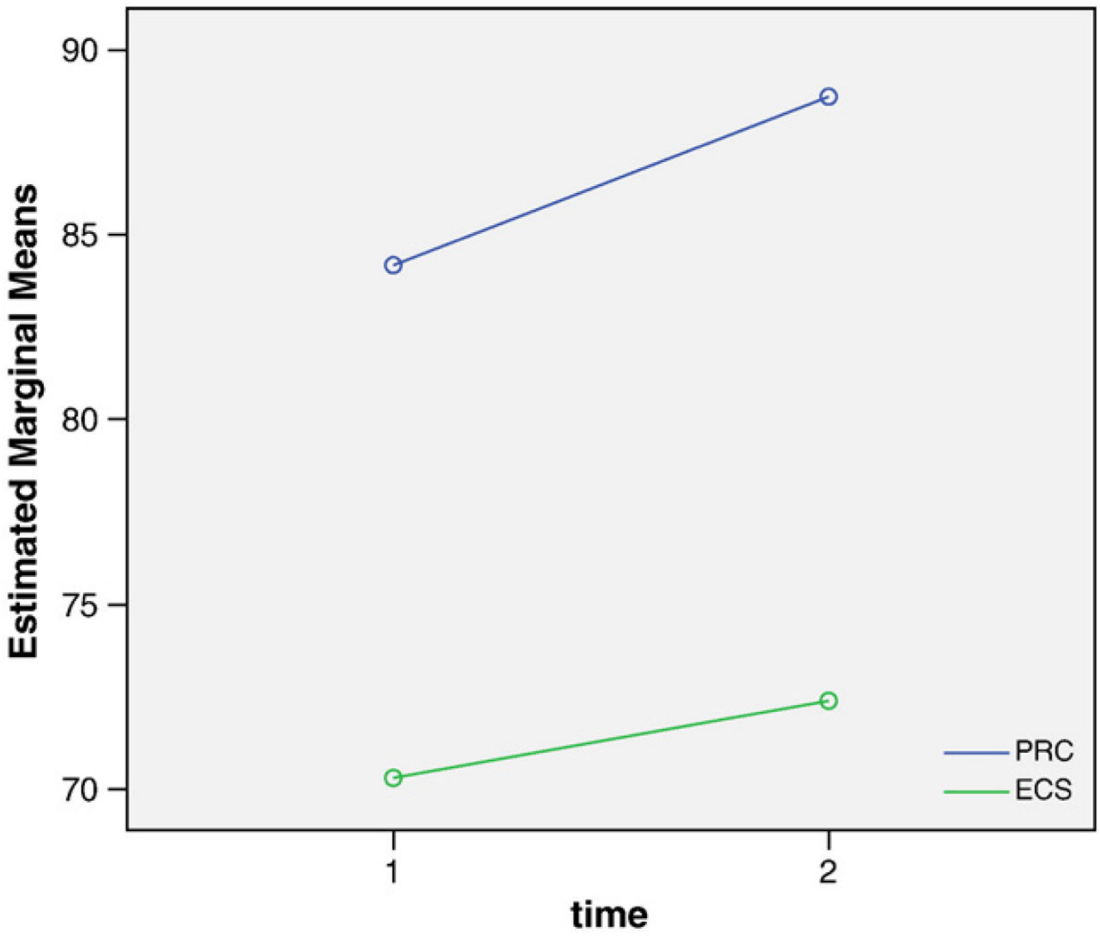

Fig. 10.
Estimated marginal means of memory for sentences.

Table 1

Constructs and instruments

Constructs	Instruments[a]
Early literacy	
Phonological awareness	Phonological Awareness Task
Letter and word recognition	WLPB-R Letter-Word Identification
Writing and spelling	WLPB-R Dictation
Oral Language	
Vocabulary	WLPB-R Picture Vocabulary
Language recall	WLPB-R Memory for Sentences

Note. The Phonological Awareness Task is researcher-developed (see Lopez & Tabors, submitted for publication); WLPB-R is the Woodcock Language Proficiency Battery-Revised (Woodcock, 1991a; Woodcock & Muñoz-Sandoval, 1995).

[a]Each instrument has a Spanish and an English version.

Table 2

Mean performance scores on early literacy and oral language tests for ECS and PRC samples

	Early literacy						Oral language			
	Phonological Awareness		Letter-Word Identification		Dictation		Picture Vocabulary		Memory for Sentences	
	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall	Spring
ECS English										
n	308	317	312	317	311	317	312	317	306	314
M	4.40	6.73	90.81	91.13	88.75	91.64	68.08	70.53	73.08	77.22
SD	3.79	4.93	9.63	12.60	13.87	14.53	19.20	18.56	19.02	14.77
Range	0–19	0–23	61–120	59–127	18–124	42–124	14–114	2–113	0–127	37–129
ECS Spanish										
n	313	314	314	317	314	317	316	318	306	310
M	4.09	7.50	88.99	85.63	90.43	90.90	65.28	62.01	70.17	72.03
SD	3.37	4.21	7.46	9.32	13.03	9.24	16.62	19.05	16.91	16.68
Range	0–16	0–23	63–120	59–128	14–121	51–118	7–130	0–133	0–115	21–113
PRC Spanish										
N	144	144	152	144	152	144	152	144	151	144
M	3.62	5.44	87.99	85.22	86.73	90.67	84.04	86.99	83.87	88.61
SD	2.88	3.92	6.35	11.09	15.88	10.80	10.78	13.40	17.59	12.70
Range	0–12	0–18	68–115	58–190	15–117	40–125	63–117	53–124	19–131	48–112

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