
Dual Language Abilities of Bilingual Four-Year Olds: Initial Findings from the Early Childhood Study of Language and Literacy Development of Spanish-speaking Children

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Abstract

This article describes language and early literacy skills in Spanish and English for a sample of 344 bilingual children in Massachusetts and Maryland (ECS) and a comparative group of 152 monolingual Spanish-speaking children in Puerto Rico (PRC). The children in the study were assessed as 4 year-olds entering pre-kindergarten programs. There were no performance differences across languages or between samples on a phonological awareness task. The ECS sample scored, on average, two standard deviations below the monolingual population mean in oral language subtests of the Woodcock Language Proficiency Battery in both languages. On average, the PRC sample scored significantly better than the ECS sample in Spanish oral language skills. Dual language analyses demonstrate a negative correlation across languages for vocabulary, but positive correlations across languages for all other oral language and early literacy tasks. Future analyses are outlined.

During the past several decades, many immigrant families, most of whom do not use English as their home language, have arrived and settled in the United States. Consequently, in the decade between 1990 and 2000, the number of school-aged children in the US who were English language learners doubled; these children now make up close to 10% of this population. Although as many as 329 different languages may be spoken in the homes of these children (U.S. English, Inc., 2002), the largest proportion - 77% - speak Spanish at home (Office of English Language Acquisition, Language Enhancement, and Academic Achievement for Limited English Proficient Students, 2002).

As well as having an impact on public elementary and secondary education, this pattern of increasing numbers of children who are English language learners has also had an impact on pre-kindergarten (pre-K) education. For example, in 2000-2001, 26% of Head Start children nationwide were considered dominant in a language other than English. Of these children, 83% speak Spanish at home (Administration for Children and Families, 2001). Given the trend of recent immigration and the tendency of immigrants to under-report the use of non-English languages at home (Suárez-Orozco & Páez, 2002), these numbers may even under-represent the

actual totals. Successfully educating these children, beginning in pre-K, is now a major challenge throughout the United States.

The Early Childhood Study of Language and Literacy Development of Spanish-speaking Children (ECS) was developed to answer some basic questions about this population of young English language learners. The purpose of the study is twofold: (a) to collect data longitudinally from pre-K to second grade for a group of young children from homes where Spanish is spoken, and (b) to identify factors related to their development of language and literacy skills in their two languages. In this article we will be reporting the initial findings of this study on the dual language abilities of the children as 4-year-olds.

The pre-K period is a critical time for young children as they begin to make the transition from home to school. One of the most important aspects of this time period is the development of language skills that will be needed as the foundation for the literacy skills that they will be expected to acquire in the schooling context (Snow & Tabors, 1993). However, we assume that this developmental sequence of language to literacy skills may be different if a child is exposed to a second language during this time period. Given that children need to have considerable control over a variety of aspects of language, including phonology, vocabulary, syntax, discourse, and pragmatics, prior to starting the beginning-to-read process (Snow, Burns, & Griffin, 1998), it is clear that second language learners are faced with a difficult task if they are asked to develop these language skills in a new language in a short amount of time, or must begin the beginning-to-read process without having developed these language skills in their new language.

Further, when children begin to acquire a second language in a situation where that language is the societal language, as is the case for Spanish-speaking children learning English in the US, there is a very real threat that they will, at the same time, suspend development in or even begin to lose use of, their first language (Wong Fillmore, 1991). Although other researchers have not found this to be true for children in a bilingual preschool setting (Rodríguez, Díaz, Duran & Espinosa, 1995), there is no mandate that preschool children be provided with bilingual settings and most pre-K programs for second language learners are predominantly English-language environments. Unless an English-language pre-K program makes a particular effort to let parents and children know that their home language is considered an important element in development, the conclusion reached by parents and children may well be that their home language is undervalued, irrelevant, or an impediment to learning English, and therefore an impediment to school success (see Tabors, Aceves, Bartolomé, Páez, & Wolf, 2000).

Knowing what the pre-K experience is and how it is related to young children's language and literacy skills in Spanish and English, however, is only the first step in the process of investigating bilingual children's literacy development. As they enter kindergarten and as they continue into first and second grade, the children in this study will continue to experience a variety of circumstances, including being provided with literacy instruction in English, in Spanish, or in both languages (simultaneously or serially) depending upon the school program. One of the mainstays of bilingual education has always been that children should be taught to read in the language that they know best (Collier & Thomas, 1989), because literacy skills in one language are assumed to transfer to second language literacy as soon as oral control has been established over the second language. This, in fact, may be true, but we still do not have a deep enough understanding about what skills are transferable, under what programmatic circumstances, with children of what age, and with what level of language proficiency.

Finally, we need to know, specifically, what precursor factors are related to children's literacy skills in English and Spanish by the time they reach second grade. There is, of course, a constellation of factors to be considered, including background variables such as child's non-verbal IQ, parents' level of education and income, and number of years in the US; variables related to language input from the home environment; and school language of instruction and literacy program type variables. By collecting data across the time period from pre-K to second grade on children with differing levels of language and early literacy skills in Spanish and English, attending different types of programs, we will be in a position to begin to unravel some of these complexities.

The Early Childhood Study, therefore, has been designed to answer the following three interrelated research questions: (a) What are the language and early literacy skills in Spanish and English of young Spanish-speaking children as they enter and as they leave pre-kindergarten?; (b) How do these children's language and early literacy skills in Spanish and English change over time from pre-K to second grade?; and (c) What precursor factors, from their home and school contexts, predict Spanish-speaking children's Spanish and English literacy abilities in second grade?

In this article, we report on the findings from the initial data collection period in the fall of 2001. The research questions for this article are:

1. What are the language and early literacy skills in Spanish and English of young children from Spanish-speaking homes as they enter a pre-kindergarten program as 4-year-olds?
2. How do these language and early literacy skills compare to similar, monolingual Spanish-speaking children?

Method

Participants

Child participants for the Early Childhood Study were recruited by contacting parents in Head Start and public pre-K programs in three communities in Massachusetts (Boston, Framingham, and Lawrence¹), one community in Maryland (Montgomery County²), and two communities in Puerto Rico (Loiza and Trujillo Alto³). All of the children were 4 years old 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 became the Early Childhood Study (ECS) sample and the Puerto Rico participants became the Puerto Rican Comparative (PRC) sample.

Early Childhood Study (ECS) Sample

A total of 350 children and their families were successfully recruited for the ECS sample. In the fall of 2001, 6 of these children refused to be involved in the data collection (although they have been maintained in the sample for later data collection), thus the ECS sample being reported on in this article consists of 344 children. Eighty-four percent of the children in the sample were born in the United States and 5% were born in the US territory of Puerto Rico. The remainder were born in different countries in Latin America.⁴

Although most of the children in the sample were born in the US, their parents come from 22 countries and the US territory of Puerto Rico. Table 1 presents a list of the top four places of birth for the mothers and fathers of the participating children. Note that 24% of the sample did not have a father or male figure present in the home.

Table 1
Percent Distribution of Country of Origin for Mothers and Fathers of Participating Children (n=321)

	Mothers	Fathers
Dominican Republic	26.9%	16.2%
El Salvador	21.7%	18.5%
Puerto Rico	12.8%	8.4%
United States	10.2%	7.0%

The ECS sample is also diverse in terms of language use at home, years of education, and family income. Of the participating families, 69.8% report that they use only Spanish at home, while the remainder report that they use both Spanish and English at home. Levels of parental education range from 0 to 22 years. Nineteen percent of the mothers had completed eight years or less of education, 29.2% have completed 12 years of education, and 29.3% have some higher education. Twenty-five percent of the fathers have completed eight years or less of education, 17.5% have completed 12 years, and 26.6% have some higher education. The average years of formal education for mothers ($M=10.96$, $SD= 3.72$) and for fathers ($M=10.69$, $SD= 3.75$) is similar. In terms of family annual income, 77% of the families in the sample report making less than \$30,000 with 21% reporting they make less than \$10,000.

Puerto Rican Comparative (PRC) Sample

The Puerto Rican comparative sample consists of 152 Spanish-speaking 4-year-old children living in Puerto Rico. The sample was selected to be similar in age, gender, and socio-economic background to the ECS sample. Inclusion of the PRC sample enables us to determine expectable Spanish performance levels for the ECS sample. In future analyses, the use of this comparative group will allow us to disentangle the effects that different instructional practices might have on the language and literacy development of the children in the ECS sample, since the children in Puerto Rico will experience a Spanish-only instructional language environment.

Almost all the children in the PRC sample were born in Puerto Rico (96.6%). 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; the remaining parents were born in the United States. Thirty-three percent of the sample does not have a father or male figure in the home. The majority of the families report using only Spanish in their home (87.4%). Mothers' years of education range from 4 to 17, while fathers' education range from 0 to 16 years. Eleven percent of the mothers have completed eight years or less of education, 31.1% have completed 12 years of education, and 42.9% have some higher education. Ten percent of the fathers have completed eight years or less of education, 28.6% have completed 12 years, and 25.6% have some higher education. The average years of formal education for mothers ($M=12.11$, $SD= 2.46$) is slightly higher than that for fathers ($M=11.37$, $SD= 2.44$). Ninety-nine percent of the families report an

income of less than \$30,000. Fifty-eight percent of the families report an income of less than \$10,000.

Instruments

The language and literacy battery being used for this study is based on previous work on the language and literacy skills of young children (Snow, Tabors, Nicholson & Kurland, 1995), 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.

The complete battery has been designed to provide data about a group of constructs that have been shown to be related to children's later literacy achievement (Dickinson & Tabors, 2001). Table 2 displays the constructs and the instruments that are being used to collect the data for these constructs.

Table 2
Constructs and Instruments

Constructs	Instruments ^a
Phonological awareness	Phonological Awareness Task
Vocabulary	WLPB-R Picture Vocabulary
Letter and word recognition	WLPB-R Letter-Word Identification
Writing and spelling	WLPB-R Dictation
General language ability	WLPB-R Memory for Sentences
Discourse skill	Narrative Production Task ^b
Concepts about print, listening comprehension, story retelling, decoding	Book Task ^c

Note. WLPB-R is the Woodcock Language Proficiency Battery-Revised

^a Each instrument has a Spanish and an English version.

^b This task requires transcription and coding; not available for the present analysis.

^c This task was piloted in 2001-2002; not included in the present analysis.

The data being reported on in this article are from the Phonological Awareness Task and the four subtests of the Woodcock Language Proficiency Battery-Revised (Woodcock, 1991a).

The Phonological Awareness Task

The Phonological Awareness Task was developed by the research team 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.⁵ 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.⁶

The rhyme recognition subtest consists of two practice items followed by six test items. Children are shown a target picture (such as a picture of a cat) and choice pictures (such as pictures of a hat and a ball) and provided with the names of each of the pictures. They are then asked to point to the picture whose name rhymes with the name of the target picture. For test items 1 through 3, the child chooses the correct picture from two pictures, and for test items 4 through 6, the child chooses the correct picture from four pictures. The rhyme production subtest consists of two practice items and four test items. Children are asked to produce a rhyme for a word spoken by the assessor, such as "day" or "fly." If the child completes one of the two practice items correctly, the four subtest items are administered. Credit is given if the word the child provides is a rhyme, regardless of whether it is a real word or not.

The initial phoneme recognition subtest is similar in format to the rhyme recognition subtest, differing only in that the child is asked to match pictures of words that have names with the same initial sound. Again for the first three items the child chooses the correct picture from two pictures. For the second three items the child chooses the correct picture from four pictures.

The sentence-segmenting subtest consists of two practice items and five test items. The child is provided with a set of colorful tiles to use in this task. The assessor reads a sentence from two to five words in length, and the child is asked to move one tile for each word in the sentence. The syllable-segmenting subtest is similar in format to the sentence-segmenting task, differing only in that the assessor says a word and the child is asked to move one tile for each syllable in that word.

For each subtest, the child needs to pass at least one of two practice items in order for the subtest to be administered. Additionally, rhyme production is not administered if the child does not correctly answer at least four out of the six rhyme recognition items, and syllable segmenting is not administered if the child does not correctly answer at least three of the five sentence segmenting items.

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.

The English Form of the subtests was normed on a randomly selected population of 6,359 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 in Mexico, 196 in Peru, 634 in Puerto Rico, 128 in Spain, and 1,325 in the United States. Although some of the subjects used to provide norming data for these assessments lived in the US, these children

were, by design, monolingual Spanish speakers (Woodcock & Muñoz, 1995b). 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). Standard scores for all of the WLPB-R subtests are normed on a mean of 100 and a standard deviation of 15.

The four subtests being used in this study from the WLPB-R include Picture Vocabulary (Vocabulario Sobre Dibujos), Letter-Word Identification (Identificación de Letras y Palabras), Dictation (Dictado), and Memory for Sentences (Memoria para Frases). 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. The Letter-Word Identification subtest first measures symbolic learning through the use of rebuses, followed by identification of letters and then word decoding. The first items in the Dictation subtest measure children's prewriting skills, followed by items measuring their knowledge of letter forms, spelling, punctuation, capitalization, and word usage. In Memory for Sentences children are asked to repeat words, phrases, 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.

The Use of Parallel Instruments in Spanish and English

The decision to use parallel instruments in Spanish and English for this study was premised on the need to document young children's dual language abilities (see Oller & Pearson, 2002, pp. 8-12). Given that bilingual children are often tested in only one language – most often in English – we felt that being able to show young bilingual children's skills in each of their languages, and then to show how their abilities in each language are related, would contribute to our understanding of the process of dual language and dual literacy acquisition over time.

For the researcher-developed measures, like the Phonological Awareness Task, this meant that two versions of the test were developed which tapped the same constructs in the two languages. As no norms have yet been developed for this measure it is being used descriptively and to document individual children's growth over time. For the Woodcock Language Proficiency Battery, however, there are norms based on monolingual children's abilities in each of the subtests. Consequently, when we use the standardized scores as comparisons for the bilingual children in the sample, we are comparing them to monolingual children of the same age.

We are aware that there are pitfalls involved with this approach when the instruments being used have been normed and validated on a monolingual population (Valdés & Figueroa, 1996). Clearly the greatest concern is that the use of any test that has been constructed for and normed on a monolingual population means that bilingual children are being compared to children who have had different linguistic experiences from their own. However, as we are not aware of any assessments that are both appropriate for this age range and are normed on a bilingual population⁷, our decision was to use instruments that were developed for this age range, and to take into account in our interpretation of the results of these tests that we are comparing bilingual with monolingual children when we use standardized scores.

Procedures

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 time⁸. To make children in the ECS sample as comfortable as possible with the testing situation, 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.

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 session in the classroom and the assessment session. These procedures - having separate language teams and using only the language of the assessment - were used to minimize code-switching during testing sessions.

Procedures for the PRC sample were similar, although the children were assessed only once, in Spanish.

Data Analysis

Descriptive and Inferential Analysis

As a first step, measures of central tendency and measures of variance were calculated for the scores on the subtests of the Phonological Awareness Task and the standardized scores for each of the subtests of the WLPB-R⁹. These analyses were done for both languages for the ECS sample and in Spanish for the PRC sample.

Second, two sets of comparisons were made using the Phonological Awareness Task total score and the standardized scores of the WLPB-R subtests. Paired-samples *t* tests were conducted within the ECS sample to compare individual performance across languages. As a result of this analysis, the value of Cohen's *d* was calculated, in order to determine the effect sizes of these comparisons, using the means and standard deviations for the standardized scores of the WLPB-R subtests in each language.

Independent-samples *t* tests were also conducted to explore the differences in performance in Spanish between the ECS sample and the PRC sample on the Phonological Awareness Task total score and the standardized scores of the WLPB-R subtests. In order to determine effect sizes of these comparisons, the value of Cohen's *d* was calculated using the *t* test value and the degrees of freedom generated by the independent-samples *t* tests. Additionally, Levene's test of homogeneity was used in testing for possible violations of homogeneity of variance.

Dual Language Analysis

In order to demonstrate the ECS sample children's dual language abilities, bivariate displays were developed by plotting each child's score in English against the score in Spanish for the Phonological Awareness Task total score and the standardized scores on the four subtests of

the WLPB-R. These displays allow for the depiction of individual children's performance in both languages simultaneously. Bivariate correlations were also computed to determine the strength of the relationship between individual children's performances in English and Spanish on the Phonological Awareness Task total score and the standardized scores on each individual subtest of the WLPB-R.

Results

Descriptive and Inferential Results

Phonological Awareness Task

The descriptive results for the Phonological Awareness Task are presented in Table 3. Three sets of results are presented for each subtest and for the total score: (a) the results for the ECS sample in English, (b) the results for the ECS sample in Spanish, and (c) the results for the PRC sample in Spanish. For the ECS sample, a total of 332 children took the Phonological Awareness Task in English and 337 children took the task in Spanish. For the PRC sample, a total of 152 children took the test. The reported n for each subtest represents the number of children who were administered the subtest, based on the criteria mentioned previously. As can be seen in the table, there were considerable numbers of children who did not pass the practice items for the subtests or who did not reach criterion to take the rhyme production or syllable segmenting subtests.

As we anticipated, this task was quite difficult for the children in the study. The highest possible total score for this test is 26, and although one child in the ECS sample achieved a total score of 25 in English, the highest score for the ECS sample in Spanish was 16 and for the PRC sample the highest score was 12. As this task will be used through second grade, however, these results indicate that there are opportunities for children to demonstrate growth in phonological awareness in the future.

The paired-samples t test indicated no cross-language difference on the total scores for the ECS sample. The independent-samples t test indicated no difference on the total scores in Spanish between the ECS sample and the PRC sample.

Woodcock Language Proficiency Battery-Revised

Table 4 presents means, standard deviations, and ranges of the standard scores for each of the four subtests of the WLPB-R administered to the ECS and the PRC sample. The reported n for each subtest indicates that a number of children did not complete all of the subtests.

As indicated in Table 4, the abilities of the ECS and PRC samples on the four subtests of the WLPB-R are extremely varied. For the ECS sample, the standard deviations for Picture Vocabulary and Memory for Sentences in both languages exceed the expected value of 15. For the PRC sample, the standard deviation for Memory for Sentences also exceeds the expected value of 15.

When the means on the subtests are compared to the means of the monolingual norming populations on the WLPB-R, the children in the ECS sample are performing, on average, more than two standard deviations below the population mean on the Picture Vocabulary test in both

English and Spanish. On average, the children in the PRC sample are performing one standard deviation below the population mean in Spanish. Similar results are found on another oral language task, Memory for Sentences, in which the children in the ECS sample are performing, on average, close to two standard deviations below the population mean in both English and Spanish. The children in the PRC sample are performing, on average, one standard deviation below the population mean on this task. Less extreme differences are found for the two literacy tasks, Letter-Word Identification and Dictation, in which the children in the ECS sample (in both languages) and the PRC sample (in Spanish) are performing, on average, slightly less than one standard deviation below the population mean.

Table 3
Means and Standard Deviations for Phonological Awareness Task

	Rhyme Recognition	Rhyme Production	Initial Phoneme	Sentence Segmenting	Syllable Segmenting	Total
ECS						
English						
<u>n</u>	194	15	189	213	32	332
range	0-6	0-4	0-6	0-5	0-5	0-25
<u>M</u>	2.77	2.27	2.33	1.85	2.66	4.49
<u>SD</u>	1.64	1.75	1.23	1.09	1.58	4.06
Spanish						
<u>n</u>	237	12	198	191	15	337
range	0-6	0-3	0-6	0-4	0-4	0-16
<u>M</u>	2.61	.58	2.32	1.34	2.13	4.07
<u>SD</u>	1.38	1.17	1.50	.94	1.25	3.33
PRC						
Spanish						
<u>n</u>	100	1	97	72	3	152
range	0-5	0	0-6	0-4	1-2	0-12
<u>M</u>	2.42	.00	2.10	1.33	1.67	3.61
<u>SD</u>	1.32	.	1.29	.90	.58	2.84

Note. A paired-samples *t* test indicated no cross-language difference on the total scores for the ECS sample. An independent samples *t* test indicated no difference on the total scores in Spanish between ECS sample and the PRC sample. ECS refers to the Early Childhood Study sample; PRC refers to the Puerto Rico Comparative sample.

Results from the paired-samples *t* tests show significant differences across languages for the ECS sample. As reported in Table 4, significant mean differences were found for all four of the subtests of the WLPB-R when children were paired against themselves with regard to language performance. The children in the ECS sample performed significantly better in English on the Picture Vocabulary, Letter-Word Identification, and Memory for Sentences subtests, and significantly better in Spanish on the Dictation subtest. However, calculations of effect sizes show that these differences would be characterized as small as defined by Cohen (1988).

Table 4

Means and Standard Deviations for Woodcock Language Proficiency Battery-Revised (WLPB-R)

	Picture Vocabulary	Letter-Word Identification	Dictation	Memory for Sentences
ECS				
English				
n	336	336	335	330
range	14-114	61-120	18-124	0-138
<u>M</u>	68.47	90.78	88.73	73.54
<u>SD</u>	19.12	9.68	14.26	19.45
Spanish				
n	340	338	338	330
range	7-130	63-120	14-121	0-115
<u>M</u>	65.13	88.87	90.38	69.77
<u>SD</u>	16.73	7.43	12.82	17.53
PRC				
Spanish				
n	152	152	152	151
range	63-117	68-115	15-117	19-131
<u>M</u>	84.04	87.99	86.73	83.87
<u>SD</u>	10.78	6.35	15.88	17.59

Note. A paired-samples t test indicated a significant cross-language difference on Picture Vocabulary ($t(331)=2.32$, $p < .05$), Letter-Word Identification ($t(329)=4.12$, $p < .001$), Dictation ($t(328)=-2.93$, $p < .01$) and Memory for Sentences ($t(317)=3.20$, $p < .01$) for the ECS sample. The effect sizes, measured with Cohen's d , were calculated using the means and standard deviations of the English and Spanish subtests for Picture Vocabulary ($d = 0.19$), Letter-Word Identification ($d = 0.22$), Dictation ($d = 0.12$), and Memory for Sentences ($d = 0.20$).

An independent samples t test indicated a significant difference in Spanish for Picture Vocabulary ($t(429)=15.01$, $p < .001$), Dictation ($t(243)=2.70$, $p < .05$), and Memory for Sentences ($t(479)=8.18$, $p < .001$) between the ECS sample and the PRC sample. The effect sizes, measured with Cohen's d , were calculated based on the significance tests for Picture Vocabulary ($d = 1.16$), Dictation ($d = 0.24$), and Memory for Sentences ($d = 0.75$).

ECS refers to the Early Childhood Study sample; PRC refers to the Puerto Rico Comparative sample.

Results from the independent-samples t test show some significant differences between the ECS sample and the PRC sample in Spanish. After corrections for violations of assumption of equal variances for Picture Vocabulary and Dictation, differences were identified in three of the four subtests on the WLPB-R. The PRC sample performed significantly better on the two oral language subtests, Picture Vocabulary and Memory for Sentences, and the ECS sample performed significantly better on Dictation, one of the literacy subtests. Calculations of effect sizes show large effects for Picture Vocabulary and Memory for Sentences and a small effect for Dictation, as defined by Cohen (1988).

Dual Language Results

Dual language analysis results are presented in the bivariate displays in Figures 1 through 5. In each of these displays, four distinct groups of children are defined: one group has scores below the sample mean in both languages; two groups show differential abilities, being above the sample mean in one language, but below the sample mean in the other; and the final group is above the sample mean in each language, demonstrating more advanced abilities in both languages when compared to the overall ECS sample.

Figure 1 portrays each child's total score in English and Spanish for the Phonological Awareness Task. Because this is a researcher-developed measure, there is no population mean for this task. There is a slight positive correlation between the English and Spanish scores ($r=.342$, $p<.001$).

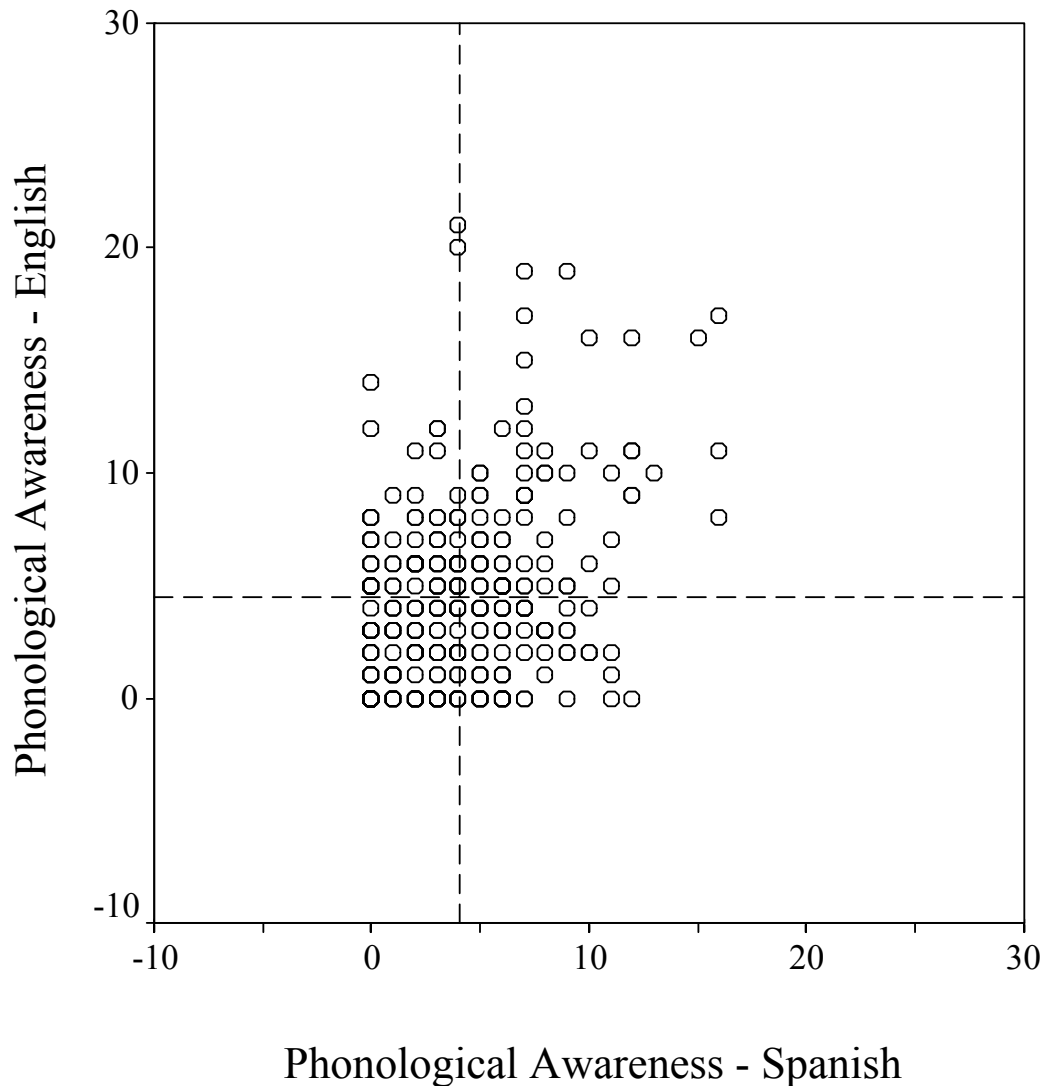


Figure 1. Bivariate plot depicting individual children's total scores in English and Spanish on the Phonological Awareness Task. The dashed line indicates the sample mean in each language.

As demonstrated by Figure 2, children's English and Spanish scores in Picture Vocabulary were negatively correlated with each other ($r= -.284$, $p<.001$). Children who scored higher in English vocabulary tended to score lower in Spanish vocabulary and vice versa. There is one outlier case of a child who scored above the norming population mean in both languages.

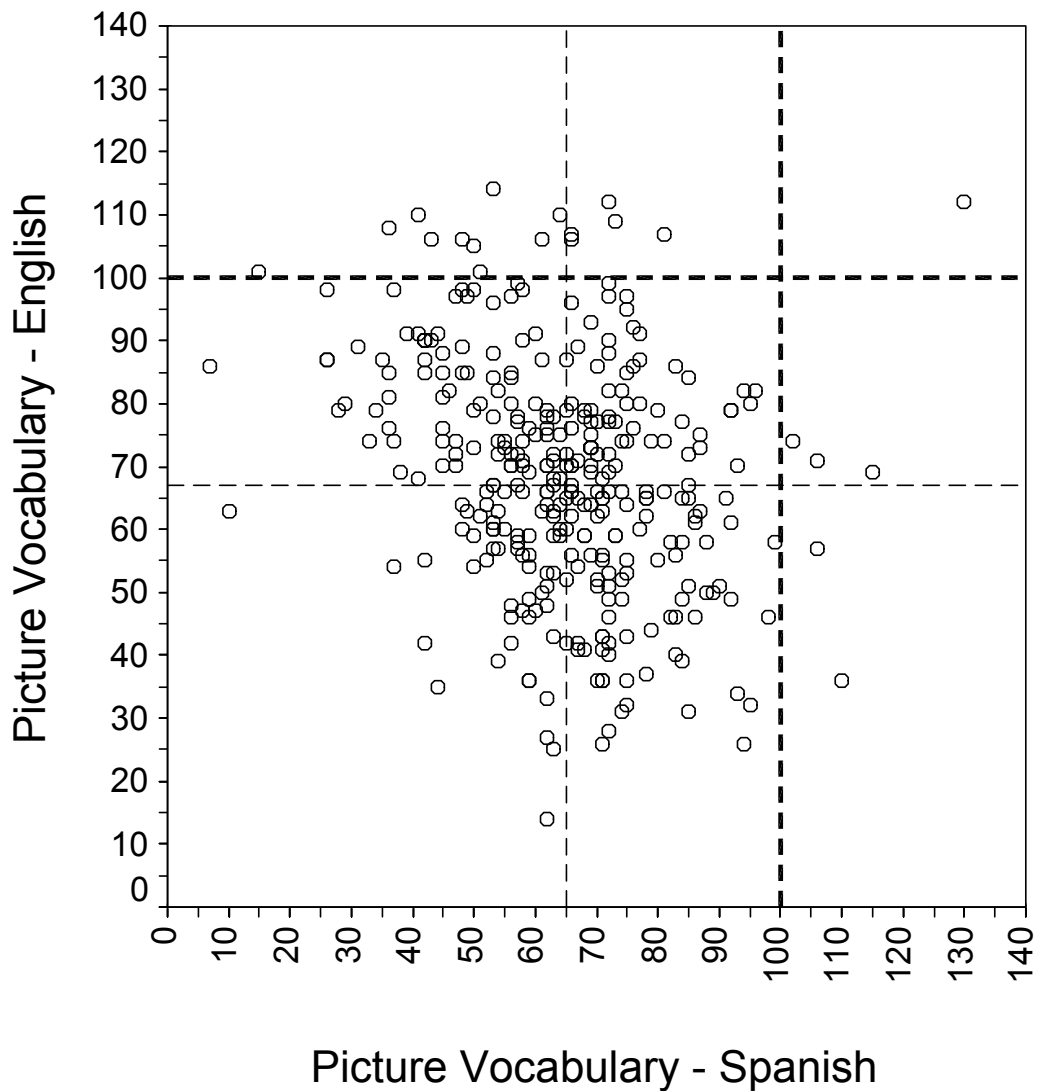


Figure 2. Bivariate plot depicting individual children's total scores in English and Spanish on the Picture Vocabulary subtest of the WLPB-R. The lighter dashed line indicates the sample mean in each language; the darker dashed line indicates the population mean of 100.

Figure 3 shows the relationship of scores for the Letter-Word Identification subtest. There is less variability of scores in the two languages on this subtest than on the Picture Vocabulary subtest. There is a moderately positive correlation between English and Spanish ($r=.512$, $p<.001$). Children have similar symbolic learning and letter identification skills across languages.

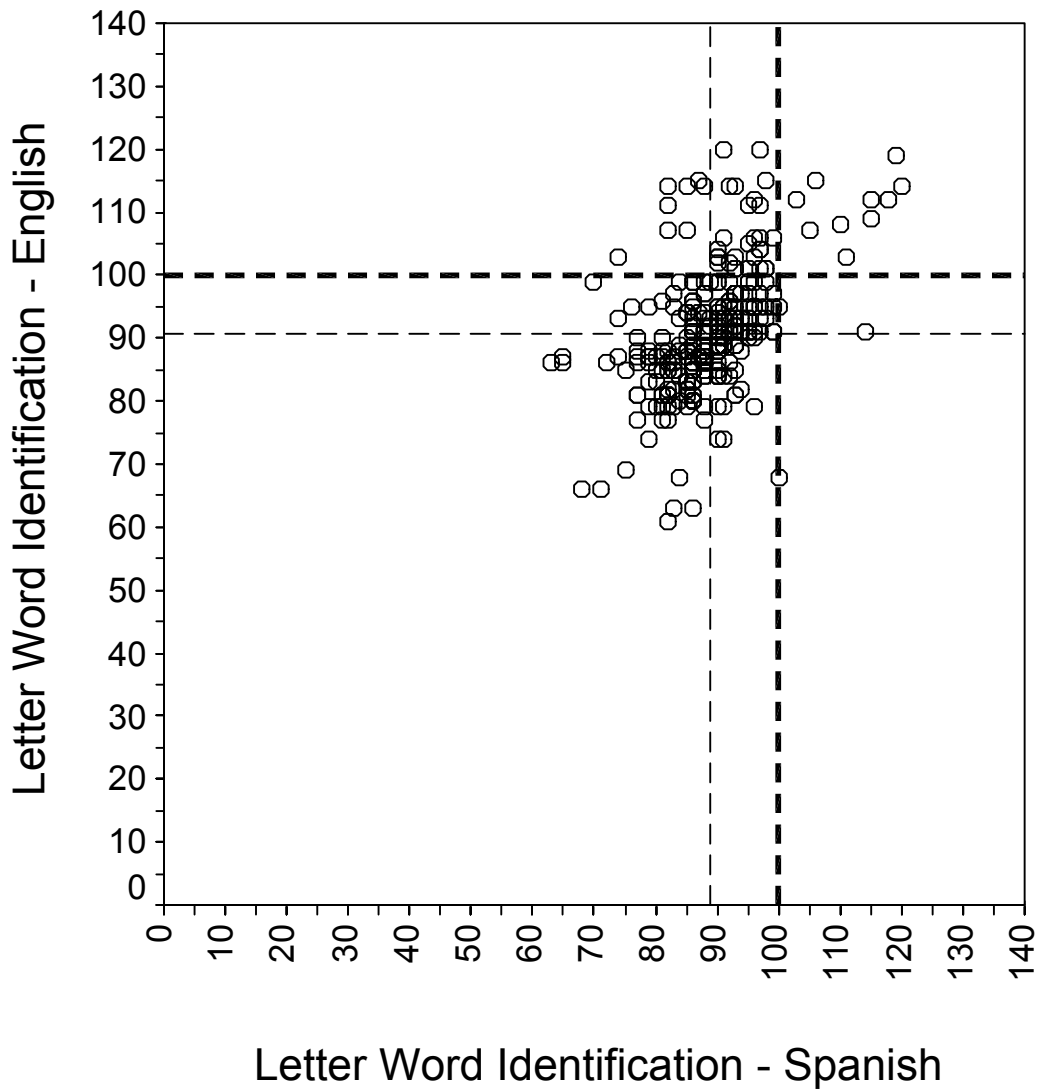


Figure 3. Bivariate plot depicting individual children's total scores in English and Spanish on the Letter-Word Identification subtest of the WLPB-R. The lighter dashed line indicates the sample mean in each language; the darker dashed line indicates the population mean of 100.

Figure 4 shows the scores for the Dictation subtest. Like the Letter-Word Identification subtest, these scores show less variability than the Picture Vocabulary subtest, but more variability than the Letter-Word Identification subtest. There is a moderate, positive correlation between the scores in English and Spanish ($r=.500$, $p<.001$).

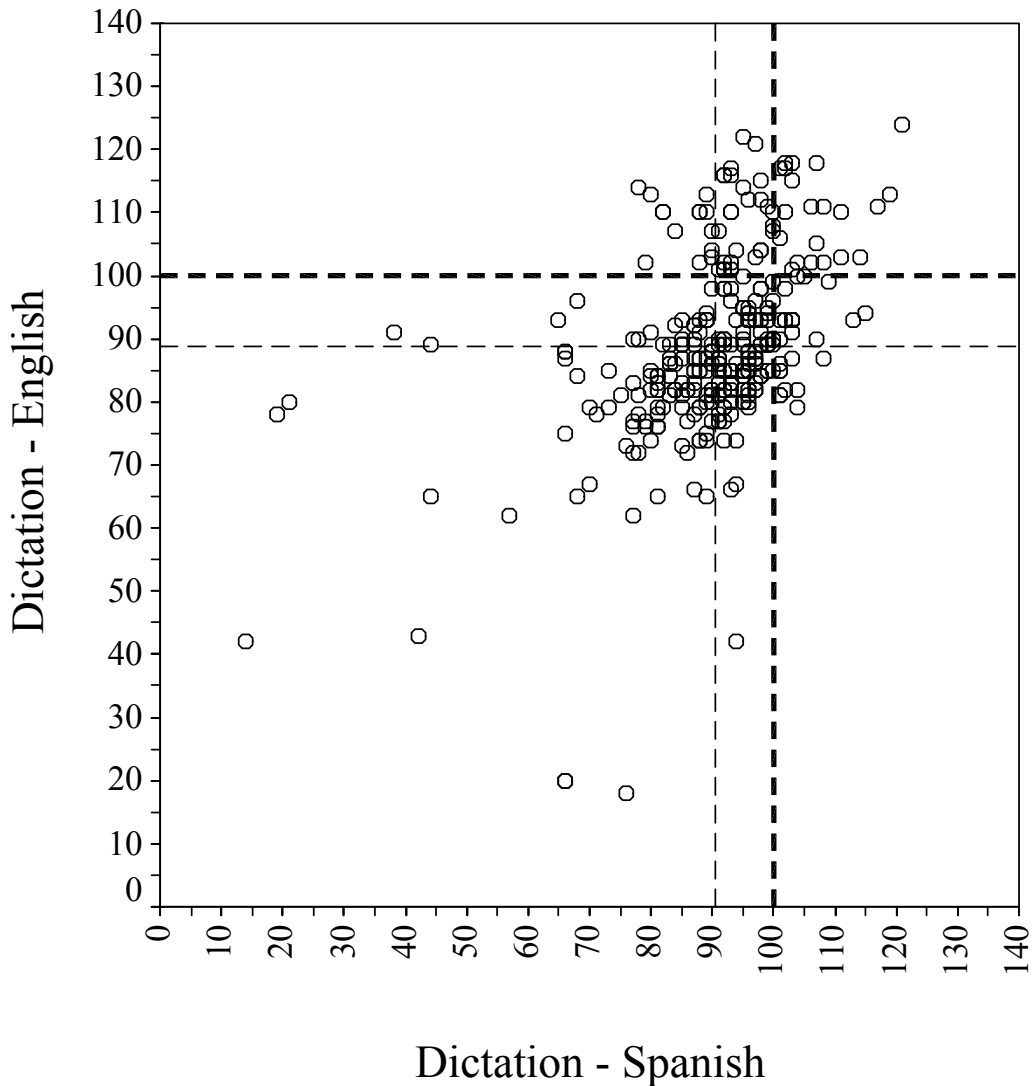


Figure 4. Bivariate plot depicting individual children's total scores in English and Spanish on the Dictation subtest of the WLPB-R. The lighter dashed line indicates the sample mean in each language; the darker dashed line indicates the population mean of 100.

Figure 5 depicts the English and Spanish scores for the subtest of Memory for Sentences. These scores are similar to the Picture Vocabulary scores in that children are scoring below the norming population mean and are showing wide variability of skills. There is a slight positive relationship between languages ($r=.252$, $p<.001$), so there is a tendency for children to score similarly in English and in Spanish.

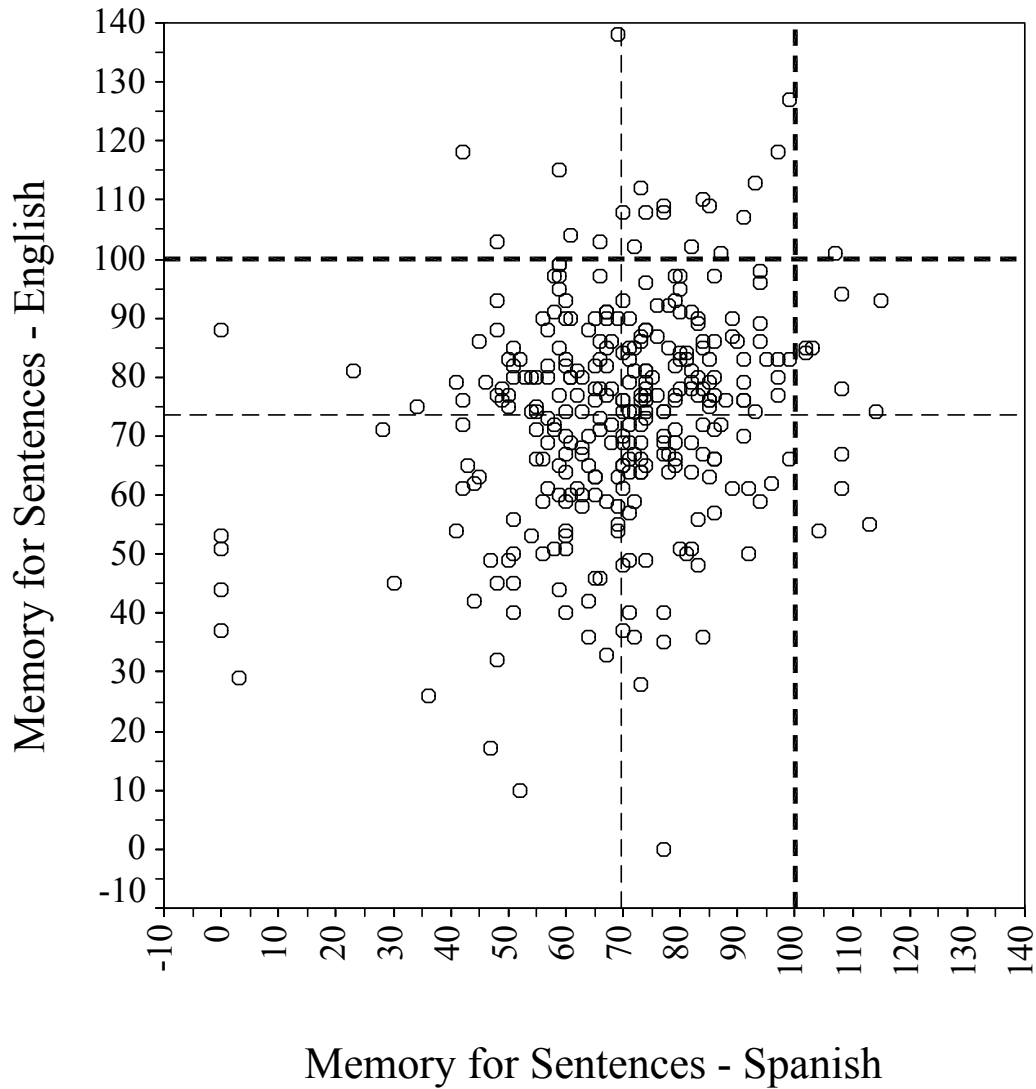


Figure 5. Bivariate plot depicting individual children's total scores in English and Spanish on the Memory for Sentences subtest of the WLPB-R. The lighter dashed line indicates the sample mean in each language; the darker dashed line indicates the population mean of 100.

Discussion

The primary purpose of this initial 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 language and early literacy skills. We assessed children's phonological awareness (as measured by the Phonological Awareness Task), vocabulary skills (as measured by Picture Vocabulary), symbolic learning and letter identification skills (as measured by Letter-Word Identification), prewriting skills (as measured

by Dictation), and language recalling skills (as measured by Memory for Sentences). We think of these skills as falling into two broad categories: (a) oral language abilities, as expressed in phonological awareness, vocabulary skills, and recalling skills; and (b) early literacy skills, as expressed in symbolic learning and letter identification, and prewriting skills.

Selecting measures to gauge 4-year-old children's English and Spanish language and early literacy skills that would be appropriate into the early grades of elementary school was not an easy task. In fact, we had to develop some of the measures to investigate specific skills that we were interested in assessing, such as phonological awareness. Our results from the Phonological Awareness Task and the subtests of the WLPB-R show that we have a battery of tests with appropriate distributions that will allow us to track the language and early literacy skills of the children through second grade.

This data collection period was also successful in that we were able to recruit a diverse sample in terms of language skills and family background. We have a group of 4-year-old children in the ECS sample who are demonstrating varying skills in the assessment battery in both English and Spanish, and a group of 4-year-old children in the PRC sample who are showing varying skills across the assessment battery in Spanish. This diversity of language and literacy skills will make the future investigation of growth for this sample very interesting.

Children's Language and Early Literacy Skills in Spanish and English as They Enter Pre-K Programs

As mentioned in the results section, one comparison that can be made with this baseline data is the comparison between the ECS sample means of the standardized scores on the subtests of the WLPB-R with the population means on these subtests, keeping in mind that these standardized scores are based on norms from monolingual populations.

Results from the WLPB-R subtests show that children in the ECS sample performed better in the early literacy tasks than in the oral language tasks in both English and Spanish. Given that these children are young English-language learners, it is 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, they also scored, on average, considerably below the norm in the oral language subtests in Spanish (see Cobo-Lewis, Pearson, Eilers, & Umbel, 2002, for a similar finding). 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. Continuing assessment in both languages will make it possible to follow individual children's trajectories in terms of gains and losses, and contextual data from home and school will help us pinpoint the influences that are at work in the language and literacy development of these children.

Comparisons between the Early Childhood Study Sample and the Puerto Rican Comparative Sample

Results showing significant differences between the Early Childhood Study sample performance in Spanish and the performance of the Puerto Rico Comparative sample are also important. Children in the ECS sample performed better in the Dictation tests than children in the PRC sample. This shows, perhaps, that children in the ECS sample have had more experience with the type of tasks that involve prewriting skills such as holding and using a

pencil. On the other hand, the PRC sample scored significantly higher than the ECS sample in the two oral language skills tests—Picture Vocabulary and Memory for Sentences. Whereas the PRC sample scored, on average, nearly one standard deviation below the population mean on these two subtests, the ECS sample scored, on average, more than two standard deviations below the population mean.

This comparison 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.

Future research with these groups will allow us to examine what happens to these differences in Spanish skills over time. Do children in the ECS sample catch up with the Spanish skills of the children in Puerto Rico? Or do the differences between these two samples widen as growth in language and early literacy development progresses in Spanish only for the PRC sample, and in English and, perhaps Spanish, for the ECS sample? In addition, we will be able to investigate how different factors in the home and classroom contribute to these differences over time. For example, how does the type of instructional environment (i.e. English-only instruction, bilingual instruction, or two-way English-Spanish instruction) impact these differences?

Dual Language Abilities: Relationships between English and Spanish Language and Early Literacy Skills in the Early Childhood Study Sample

Results from the correlation analysis show that there is a significant relationship between the ECS sample children's language and early literacy skills in English and their language and early literacy skills in Spanish. Specifically, children's phonological awareness, vocabulary skills, symbolic learning and letter identification skills, prewriting, and language recalling skills are significantly related in English and Spanish. With the exception of vocabulary skills, all of these relationships are positive, indicating that there is a tendency for children to perform similarly across languages.

The finding that there is a positive correlation between the Spanish and the English versions of the Phonological Awareness Task reinforces the theory that the foundation for phonological awareness involves conceptual knowledge about rhymes and phonemes. Spanish is similar to English in terms of linguistic levels with words being divided into syllables, onsets, rimes, and phonemes. Although previous research indicates differences between Spanish and English with regard to writing, phonological awareness is similar for both languages (Borzzone de Manrique & Signorini, 1998; Jimenez Gonzalez & Haro Garcia, 1995; Lopez, 1999). Given that English and Spanish are both languages that use the alphabetic principle, and that at this early stage children are being asked to manipulate similar concepts, this positive correlation means that, on average, these children are already applying their conceptual knowledge across their two languages (Durgunoglu, Nagy, & Hancin-Bhatt, 1993).

Findings that the ECS sample children performed similarly across languages in the Letter-Word Identification and the Dictation subtests are also not surprising, given that the initial items on these tasks are not really language specific, but are tapping into more general abilities,

such as symbolic learning and representations, and prewriting skills, such as holding a pencil, writing a straight line or a circle, and tracing letters.

The negative correlation between English vocabulary and Spanish vocabulary is, however, an important finding in this study. Children who had larger English vocabularies tended to have smaller Spanish vocabularies and vice versa as indexed by their English and Spanish performances in the Picture Vocabulary Test of the WLPB-R. This inverse relationship between English and Spanish vocabulary has been found in current research dealing with the topic of depth and breadth of vocabulary in these two languages (Ordóñez, Carlo, Snow & McLaughlin, 2002). It points to the importance of following these children through their language and early literacy learning process to find out if they are likely to lose Spanish knowledge as they learn more English, i.e. if they are in a subtractive bilingualism situation. Or alternatively, depending on the support at home and/or school for dual language development, some of these children might engage in an additive bilingual process in which skills in both languages continue to grow.

Conclusion

This research has provided a baseline description of the language skills that a group of Spanish-speaking 4-year old children brings to the beginning of their educational experience. Clearly, these children are entering pre-K programs with a diversity of skills in their two languages and these skill levels will have an impact on what the children learn in the pre-K classroom and what they continue to learn at home.

Our findings regarding the low levels of vocabulary demonstrated by the children in the ECS sample are important given the well-documented link between vocabulary size and early reading ability (Snow, Burns, & Griffin, 1998). These findings suggest that this group of young bilingual children may well be at risk for early literacy development due to their low levels of vocabulary in both languages.

Future analyses on these data will examine changes in these children's dual language and early literacy skills after spending a year in a pre-K classroom. These analyses will take into account the language or languages used in the classroom and at home, as well as the richness of the language and literacy environment in these contexts. Future research on this sample will track how their dual language and early literacy skills develop over time from pre-K 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.

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Endnotes

¹ Cooperating partners in Boston for the pre-K year were ABCD Boston Head Start and the East Boston Early Education Center, a Boston Public School. Cooperating partners in Framingham were SMOC Head Start and BLOCKS, a Framingham Public School. The cooperating partner in Lawrence was the Greater Lawrence Head Start.

² Cooperating partners in Montgomery County for the pre-K year were Head Start of Montgomery County and the Extended Elementary Education Program of the Montgomery County Public Schools.

³ The cooperating partner in Puerto Rico for the pre-K year was the Council for Preschool Children of Puerto Rico, Inc. Head Start.

⁴ All family demographic information is derived from the parent interview which was administered by telephone or in person. Most of the interviews were done with the mothers of the participating children and lasted 15 to 20 minutes. The information from these interviews was available for 321 of the 344 families in the ECS sample and 119 of the PRC sample.

⁵ 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.

⁶ Rasch analyses indicate a reliability of .68 on the English version of the test and a reliability of .59 for the Spanish version. Rank order correlations indicate that each subtest contributes positively to the total score for both versions of the test, therefore all subtests have been retained in the measures.

⁷ In fact, the only language proficiency assessment that has been validated with Spanish-English bilingual children of differing abilities is the Bilingual Verbal Ability Tests (Muñoz-Sandoval, Cummins, Alvarado, and Ruef, 1998). This test is, however, not appropriate for children younger than five years old.

⁸ In the ECS sample, 8 children who were assessed in Spanish refused to be assessed in English, while 4 children who were assessed in English refused the assessment battery in Spanish. Some children refused to complete individual subtests within the battery.

⁹ Raw scores for each of the subtests were converted into standard scores using the Woodcock Compuscore and Program Profiles software program.