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Dual language development of Latino children: Effect of instructional program type and the home and school language environment



Brian A. Collins

Department of Curriculum and Teaching Hunter College, CUNY 695 Park Avenue, W1032, New York, NY 10065, United States

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ABSTRACT

Latino dual language children typically enter school with a wide range of proficiencies in Spanish and English, many with low proficiency in both languages, yet do make gains in one or both languages during their first school years. Dual language development is associated with how language is used at home and school, as well as the type of instructional program children receive at school. The present study investigates how changes in both Spanish and English proficiencies of Latino, second-generation immigrant children ($n = 163$) from kindergarten to second grade relate to instructional program type as well as language use at home and school. A series of MANCOVAs demonstrated significant dual language gains in children who were in bilingual classrooms and schools where Spanish was used among the teachers, students, and staff. Furthermore, only in classrooms where both Spanish and English were used did children reach age-appropriate levels of academic proficiency in both languages. Home language use was also significantly associated with dual language gains as was maternal Spanish vocabulary knowledge before controlling for maternal education. Educational implications and potential benefits associated with bilingualism are discussed.

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Introduction

Approximately one in four children in the U.S. is Latino, the majority (71%) are from immigrant families and live in Spanish-speaking homes (Garcia & Jensen, 2009; Hakimzadeh & Cohn, 2007; U.S. Census, 2010, 2011). In the past decade alone, the proportion of Latino children in U.S. schools has risen from 11 to 23 percent of all students (NCES, 2010). This demographic change has had an enormous impact on schools where an increasing number of students are still developing language skills in Spanish, while at the same time learning how to speak, read and write in English. This population of students has been described as Latino dual language learners (DLL). Despite growing numbers, there is continued debate on how to best educate this rapidly growing school population and how to adapt instruction to best meet their needs and support their healthy development.

Latino dual language learners are understudied and underserved (Gutiérrez, Zepeda, & Castro, 2010; Tienda & Haskins, 2011; Toppelberg & Collins, 2010). Empirical research addressing the early development and education of DLLs is imperative to

increasing our understanding of the individual and contextual forces shaping their school functioning. This study aims to investigate the development of Spanish and English proficiency in a sample of Latino children during their first years of school. In addition, factors from the language environment at home and school, which are associated with dual language development, are considered.

Emerging bilingualism in the critical early school years

The transition from home to school is considered one of the most fundamental and influential developmental periods for all children (Pianta & Cox, 1999). For Latino DLLs, the transition to school is critical because it demands negotiating a new culture with a unique system of rules and behaviors, and, in most cases, a distinct new language (Crosnoe, 2005). The magnified difference between the linguistic environments of the school and homes could be enriching or potentially overwhelming (Collins, Toppelberg, Suárez-Orozco, O'Connor, & Nieto-Castañón, 2011). Latino DLLs often abruptly shift from using Spanish at the home language to using English in the early school years (Portes & Hao, 1998). Making such a rapid change to favor the school language without having yet developed substantial home language competence may limit children's

E-mail address: bcollins@hunter.cuny.edu

development of both languages (Sparks, Patton, Ganschow, & Humbach, 2009).

Due to the assimilative forces that propel children to learn English quickly, a shift away from the home language is likely to occur shortly after beginning school (Hakuta & Pease-Alvarez, 1994; Worthy, Rodriguez-Galindo, Assaf Czop, Martinez, & Cuero, 2003). Latino children of immigrants are more likely to become English dominant than to develop proficiency in both Spanish and English (Portes & Rumbaut, 2001). Earlier research has evidenced this shift toward English language use primarily during the adolescent years as youths spend more time in contexts outside of the home (Veltman, 1983). However, more recent research shows that a hyper-accelerated language shift is often occurring much earlier, when children begin school and develop proficiency and general preference for English (Tse, 2001). Latino DLLs often start using English almost exclusively outside of the home and as much as possible inside of the home (Portes & Rumbaut, 2001). Language shift has been documented as early as preschool or kindergarten and is evident through the elementary grades (Pease-Alvarez & Winsler, 1994). Wong-Fillmore (1991) found that children who attended preschools where English was primarily used were subsequently less likely to speak their home language than children who attended preschools where the home language was used. However, many of these studies used parental and self-reports as a measure of language proficiency which can be more objectively measured through direct assessments (Valdes & Figueroa, 1994). Studies that have used standardized, direct measures of dual language proficiencies have shown that children do not necessarily lose their home language while learning English (Winsler, Diaz, Espinosa, & Rodriguez, 1999). Rather, the development of both languages is often interdependent and related to the quality of language support and exposure in distinct contexts (Hammer et al., 2012). For DLLs, the home and school linguistic environment, and how language is used in each context, account for substantial variability in development of both languages.

Home linguistic environment

The home environment is particularly important for language development as it is where children are first exposed to language and provided with the experiences needed for the growth and advancement of linguistic skills (Snow, 1999). Substantial research has demonstrated that the quality, frequency, and type of language used in the home are associated with large differences in children's language competences (De Houwer, 2007; Hammer et al., 2012; Hart & Risley, 1995). The home linguistic environment of DLLs is shaped by the amount of language exposure to both languages across multiple dyads of siblings and parents (De Houwer, 2007; Garcia & Jensen, 2009; Place & Hoff, 2011; Quiroz, Snow, & Zhao, 2010). The proportional amount of exposure to each language at home has a significant effect on language development in English-Spanish bilingual children (Pearson, Fernández, Lewedeg, & Oller, 1997). DLLs who have rich home language experiences tend to develop strong competences in that language and, in turn, are likely to develop strong second language competences (Sparks, Patton, Ganschow, Humbach, & Javorsky, 2008). Maternal vocabulary knowledge is also associated with children's vocabulary growth and may mediate the effect of maternal education on children's language ability (Pan, Rowe, Singer, & Snow, 2005).

In contrast, the use of the second language at home may have an inverse effect on the development of the home language. In a recent study of DLLs, increased use of English at home was not associated with gains in children's English proficiency, but rather with decreases in children's Spanish proficiencies (Hammer, Davison, Lawrence, & Miccio, 2009). Furthermore, research suggests that because socioeconomic status (SES) is closely related to the home

language environment, there is an association between increases in SES and the quality and quantity of linguistic input that the child receives (Sparks et al., 2008). There is empirical evidence for the effect of SES on children's home language development as well as long-term effects on dual language development as children enter school (Snow, Burns, & Griffin, 1998).

School linguistic environment

The linguistic environment at school also plays a crucial role in children's dual language development (Páez, Tabors, & López, 2007). How each language is used in the school and the within-school interactions between students and teachers shape how children develop both languages (Gámez & Lesaux, 2012). When the home language is used at school among peers and teachers, there is an associated improvement in home language proficiency among DLLs (Genesee, Lindholm-Leary, Saunders, & Christian, 2006). The language used and supported during instruction of DLLs is critically important. While virtually all U.S. school programs include some amount of English language instruction (Saunders, Foorman, & Carlson, 2006), some programs use varying amounts of children's home language for instruction (Brisk, 2005). The language of instruction of DLLs varies from using English exclusively (mainstream English and immersion programs) to programs where literacy and content-area instruction are delivered in both the home language and English (bilingual programs). It is important to point out that educational support for the home language is not typically associated with delays or limited development of English (Collier & Thomas, 2004; MacSwan & Pray, 2005). In many cases, a more fully developed home language is associated with increases in the rate and level of development of English, as well as academic achievement (Burchinal, Field, López, Howes, & Pianta, 2012). Latino DLLs in bilingual programs have demonstrated comparable gains in English, and greater gains in Spanish, as compared to Latino DLLs in English-only schools (Barnett, Yarosz, Thomas, Jung, & Blanco, 2007). For example, in a longitudinal study, Barnett et al. (2007) found that Spanish speaking, low-income, preschool children who attended high-quality bilingual schools made significant gains in both languages each year. These gains were greater than those made by a control group who attended schools with English-only programs.

Numerous studies suggest the effectiveness of bilingual instruction on increasing proficiency in both the home language and English (Rolstad, Mahoney, & Glass, 2005). Yet, there is an ongoing need for research that examines dual language development and the relationships between both languages over time (Hammer, Jia, & Uchikoshi, 2011). To date, most dual language studies have focused on children's abilities in each language separately with much of the extant work investigating specific aspects of language abilities (mainly vocabulary). Thus, there is a need for approaches that address language abilities in a more comprehensive way that include multiple components of each language (e.g. vocabulary, morpho-syntax, oral comprehension). Furthermore, consideration of home and school factors that support the development of dual language proficiencies is needed in order to prepare children to adequately meet the linguistic demands of academic contexts.

In order to extend the existing body of literature and address these needs, the present study investigates the development of dual language proficiencies of Latino children in kindergarten and second grade. Particular attention is paid to the effect of instructional program types on dual language proficiency as well as home and school factors in the linguistic environment. Specifically, this study explores the following research questions: (1) How do children's dual language proficiencies (Spanish and English) change from kindergarten to second grade?; (2) How does the home language environment relate to changes in children's dual language

proficiencies?; and (3) How does the school language environment relate to changes in children's dual language proficiencies? The present study examines these questions with a longitudinal focus and explores change in children's Spanish and English proficiency over the course of two years using a battery of standardized direct measures of children's Spanish and English proficiency. In addition, we consider the home and school language environment based on parent and teacher reports, and direct observation.

Method

Participants

Children were recruited from 15 public elementary schools in the Boston, MA area that had high enrollments of Latino children (>30%). After receiving approval from the Institutional Research Board (IRB), school district, and school principals, student information from school enrollment lists was used to determine potential study eligibility based on children's home language. Families of potential participants in kindergarten classrooms were first sent IRB approved recruitment letters in Spanish and English explaining the study in comprehensible language. Letters were followed by phone calls to confirm eligibility based on specific inclusion/exclusion criteria. All of the children in the study were from predominately Spanish-speaking homes and were born in or arrived in the U.S. prior to age three with at least one foreign born parent from a Latin American country. Children with severe developmental disorders were excluded. Willingness to participate and study eligibility were obtained with verbal and written parental consent as well as child assent.

The present study draws from data collected as part of a larger study of Latino dual language learners ($N = 228$) and their social and emotional well-being (Toppelberg, Hollinshead, Collins, & Nieto-Castañon, 2012). Equal numbers of boys and girls were recruited for the study in kindergarten (mean age = 6, $SD = 1$) and participated in a follow-up two years later (mean age = 8; $SD = 1$). Included in the present study are all children whose Spanish and English proficiencies were assessed at both kindergarten and second grade ($N = 163$). This subset of children represents 71% of the full sample. Preliminary analyses revealed no systematic group differences between children in the subset and full sample. In most cases, mothers were the primary caregivers (99%), and approximately half (56%) of fathers lived with their children in the study. The largest group of mothers came to the U.S. from the Dominican Republic (53%) and Puerto Rico (22%) at a mean age of 19. The median household income was less than \$20,000 per year and most of the families (86%) were recipients of at least one government program that tied eligibility to income threshold levels linked to federal or state poverty guidelines (U.S. Census, 2000). Mothers had moderate to low levels of education; slightly more than half (66%) graduated from high school, mainly in their home countries. Demographic data are presented in Table 1.

Procedures

Interviews were conducted in the children's homes, primarily with children's mothers. In most cases, mothers chose to conduct the interview in Spanish. Trained bilingual research assistants collected information on home, family, and sociodemographic variables. Children were assessed individually in offices outside of the classroom on separate days for Spanish and English proficiency. Language assessments were counterbalanced so that half the sample was tested in English first and other half was tested in Spanish first. Protocols from the published assessment manuals were followed by trained research assistants who were native speakers of

Table 1
Family demographics ($n = 163$).

| | No. | % | No. | % |
|----------------------------------|-----|-----|--------|--------|
| Single parent | 72 | 44 | | |
| Living in poverty | 140 | 86 | | |
| Mother as primary caregiver | 162 | 99 | | |
| | | | Mother | Father |
| <i>Parent place of birth</i> | | | | |
| United States | 9 | 6 | 6 | 4 |
| Dominican Republic | 86 | 53 | 87 | 55 |
| Puerto Rico | 36 | 22 | 30 | 19 |
| El Salvador | 9 | 6 | 11 | 7 |
| Guatemala | 9 | 6 | 6 | 4 |
| Other (Latin America) | 14 | 9 | 13 | 8 |
| Total | 163 | 102 | 153 | 97 |
| <i>Parent level of education</i> | | | | |
| Some elementary | 10 | 6 | 13 | 8 |
| Completed elementary | 8 | 5 | 6 | 4 |
| Some high school | 36 | 22 | 32 | 24 |
| GED | 15 | 9 | 6 | 4 |
| Completed high school | 46 | 28 | 51 | 38 |
| Some college | 32 | 20 | 15 | 14 |
| Completed college | 16 | 10 | 12 | 8 |
| Total | 163 | 100 | 135 | 100 |

Spanish and English. All assessments were repeated two years later when the children were in second grade.

All of the teachers of participating children agreed to participate and provided written full-informed consent. We did not select classrooms based on the type of instructional model. All of the classrooms had students from English- and Spanish-speaking homes, but differed naturally with respect to instructional program type. At the outset of this study, the state had recently instituted an "English Only" policy; however, many of the schools had received a waiver to continue using Spanish and English in the classroom. Children participating in the study were naturally distributed across the various program types with an average of four participants in each classroom. Teachers completed surveys and checklists, providing information on classroom characteristics, their teaching practices, and individual children. Classrooms were observed at the end of the school year by teams of bilingual research assistants who recorded language use and instructional practices.

Measures

Spanish and English proficiency were measured using the Woodcock Language Proficiency Batteries-Revised: (WLPB-R; Woodcock, 1991; Woodcock & Muñoz-Sandoval, 1995); the most current versions available at the time of the study were used. The Spanish and English versions were administered during separate sessions. The WLPB-R measures specific linguistic domains of language skills and is considered one of the best available standardized measures of academic oral language proficiency with Spanish and English parallel forms (Hakuta, 2000). Four individually measured test scores (Memory for Sentences; Picture Vocabulary; Listening Comprehension, and Verbal Analogies) were combined to yield an oral language cluster score, which is a global measure of general language proficiency (Woodcock, 1991). Memory for sentences is a mixed expressive-receptive measure of syntactic and semantic proficiency, where the child is asked to repeat words, phrases and then whole sentences of increasing length which contain a rich variety of grammatical morphemes and syntactic structures. Picture vocabulary is a measure of expressive vocabulary involving the naming of items represented as pictures on a single-word level. Listening comprehension is a measure of syntactic and semantic proficiency,

where the child listens to increasingly complex sentences or passages and is asked to provide the word that is missing at the end of the sentence or passage. Verbal analogies is a measure of semantics and morphosyntactic knowledge, where the child is asked to comprehend and verbally complete an increasingly difficult logical word relationship. The internal consistency across the subtest in each language at kindergarten and second grade was high with Cronbach alpha coefficients ranging from .85 to .90.

The WLPB-R has been used widely to measure language proficiency in educational settings (Páez et al., 2007; Proctor, Carlo, August, & Snow, 2005) and in relation to academic achievement and subsequent school success (Dickinson & Sprague, 2001). The WLPB-R has published validity, reliability and norms for ages 2–90 in Spanish and English. The current study uses standard scores to determine age appropriate levels of proficiency by using the common criteria of one standard deviation of 15 from the normed mean of 100. Using this cut-off, a standard score (SS) of 85 was considered a minimum level to be considered proficient in English and/or Spanish. In addition, *W* scores, an equal-interval ability scale not normalized by age, are used in the main analyses to allow changes in language proficiency to be analyzed without adjusting scores to age expectancies.

Maternal education was measured by the number of years of schooling completed by the mother. Mothers were the primary caregiver for the overwhelming majority of the children in the sample (99.4%) and approximately half (44.2%) of children lived in female-headed, single-parent homes. Fathers' education levels were reported to be similar to mothers in the current study (see Table 1). A continuous score reflecting the number of years of schooling completed by mothers was used as a covariate in predictive analyses.

Home language use was measured using mothers' reports of the language spoken most frequently among the various family dyads at the home (mother, father, children/siblings) using the Language and Literacy Use Questionnaire (Tabors & Paez, 2001). Cronbach alpha coefficients were calculated to estimate the internal consistency across the different dyads ($\alpha = .84$). Mothers reported speaking to the child in Only Spanish (80%), Spanish and English (15%), or Mostly English (5%). Fathers were reported as speaking to the child in Only Spanish (77%), Spanish and English (15%), or Mostly English (7%). Other children/siblings in the home were reported as speaking to the child in Only Spanish (22%), Spanish and English (31%), or Mostly English (47%). A single home language use variable was calculated using a mean score of all home dyads. This variable, which described overall home language use, was subsequently coded categorically as (1) more English; (2) Spanish and English; or (3) more Spanish.

Maternal vocabulary was measured using direct assessment of mothers' Spanish receptive vocabulary knowledge. The number of words mothers knew was used as an index of the quality of language in the home. Mothers were assessed in Spanish at their homes by a research assistant using the Test de Vocabulario en Imágenes Peabody (TVIP; Dunn, Lugo, Padilla, & Dunn, 1986). This measure of receptive vocabulary requires the test taker to select the picture that best represents the meaning of the stimulus word presented orally by the examiner. The TVIP was normed in Puerto Rico and Mexico and items were carefully selected through rigorous item analysis for their universality and appropriateness to Spanish-speaking communities. TVIP internal consistency reliability for this age group is .93. Standard scores were calculated and used to describe mothers' levels of vocabulary knowledge as Low (<85 SS), Moderate (85–115 SS), or Superior (>115 SS).

School language use was recorded by researchers' direct observations during one-hour visits to each classroom at the end of the school year. Classroom observations were not possible for 14 of the children due to scheduling conflicts; for those children the

school language use variable is treated as missing data with listwise deletion. Language use at school was scored as (1) only English; (2) mostly English; or (3) Spanish and English among teachers, students, and observed on school signs, bulletin boards, and reading materials. Teachers were observed speaking to the child in Only English (57%), Mostly English (26%), or Spanish and English (17%). Students were observed speaking to other children in Only English (19%), Mostly English (41%), or Spanish and English (40%). School signs, bulletin boards, and reading materials were observed to be Only English (53%), Mostly English (34%), or Spanish and English (13%). A high level of inter-rater reliability was demonstrated ($\alpha = .90$) and Cronbach's alphas demonstrated high internal consistency ($\alpha = .93$) among the scale items.

Instructional program type was determined by teacher reports of classroom instructional program type and the percent of instruction provided in Spanish and English. Reports demonstrated strong internal consistency ($\alpha = .78$). Classrooms were coded categorically as (1) mainstream English programs where all instruction was delivered in English; (2) English instruction with support programs where all instruction was in English but included accommodations such as English as a Second Language (ESL) services, scaffolding of content, and materials specifically designed for English language learners; and (3) bilingual programs where instruction was provided in both the Spanish and English.

Data analysis

Measures of central tendency and variability were first examined for all variables. Outliers were identified and missing data were examined. Next, a decomposition of variance (e.g. child, classroom, school) was performed. Because the children were nested in classrooms ($n = 39$) and schools ($n = 15$), it was possible that the OLS regression assumption of independent residuals would not be met. As such, it was necessary to determine whether significant portions of the variance in the outcome variables were attributed to classroom- and school-level clustering. An intra-class correlation (ICC) was calculated by dividing the between-clusters variation by the total amount of variation in the outcome variables. The variation of language change in Spanish and English over time explained by school-level membership was near 0 (ICC = 0.01) and the ICC for between-classroom variation was 0.08. This level of clustering (less than 10%) of the total variance is considered small by many methodologists working with nested data, and thus unlikely to significantly affect standard errors in predictive analyses (Lee, 2000). Given little meaningful nesting coupled with the small sample sizes of study participants in each classroom (average of 4 participants in each class), we used traditional regression-based analysis techniques (Raudenbush & Bryk, 2002). Considering that Spanish and English proficiencies were interrelated and the multivariate outcomes of our research questions, MANOVA analyses were determined to be the most appropriate tests. Follow-up repeated-measure ANOVAs were conducted for Spanish and English separately.

Research Question 1, regarding changes in dual language proficiencies between kindergarten and second grade, was investigated using a repeated-measures multivariate analysis of variance (MANOVA) model (Fitzmaurice, Laird, & Ware, 2012). In the first set of analyses, the within-subjects factors were time (Time 1, Time 2) and language (Spanish, English). There were no between-subjects factors included in the first model, as the main research aim was to examine change in Spanish and English language proficiency over time. Next, between-subjects variables (home language use, maternal vocabulary, school language use, instructional program type) were considered for their role in moderating change in dual language proficiencies over time. These variables were operationalized using three categorical levels and added to the previous MANOVA model as between-subjects factors. To

Table 2
Descriptives of Spanish and English standard score means at kindergarten and second grade.

| | N | % | English kindergarten | | English 2nd grade | | Spanish kindergarten | | Spanish 2nd grade | |
|-----------------------------|-----|-----|----------------------|-------|-------------------|-------|----------------------|-------|-------------------|-------|
| | | | Mean | SD | Mean | SD | Mean | SD | Mean | SD |
| Full sample language means | 163 | 100 | 69.47 | 18.35 | 85.71 | 16.99 | 68.43 | 19.44 | 74.04 | 21.30 |
| Home language use | | | | | | | | | | |
| More English | 19 | 12 | 78.16 | 14.87 | 89.79 | 13.95 | 47.53 | 22.42 | 52.95 | 23.25 |
| Spanish and English | 85 | 52 | 72.73 | 18.17 | 88.53 | 17.10 | 69.81 | 17.92 | 76.00 | 20.67 |
| More Spanish | 59 | 36 | 61.98 | 17.22 | 80.32 | 16.62 | 73.17 | 16.31 | 78.00 | 17.71 |
| Maternal Spanish vocabulary | | | | | | | | | | |
| Low | 55 | 34 | 63.09 | 18.23 | 78.87 | 14.53 | 65.00 | 17.28 | 71.11 | 20.25 |
| Moderate | 85 | 53 | 72.79 | 16.63 | 88.69 | 16.60 | 69.96 | 20.55 | 74.89 | 22.46 |
| Superior | 20 | 13 | 73.20 | 22.59 | 92.90 | 19.55 | 72.75 | 20.65 | 79.30 | 19.34 |
| School language use | | | | | | | | | | |
| Only English | 73 | 48 | 69.89 | 17.19 | 86.04 | 15.30 | 64.21 | 21.03 | 67.64 | 21.02 |
| Mostly English | 57 | 38 | 67.19 | 18.41 | 83.42 | 16.26 | 70.54 | 17.05 | 74.75 | 19.55 |
| Spanish and English | 22 | 14 | 79.59 | 17.19 | 94.86 | 19.82 | 80.00 | 13.50 | 94.27 | 16.58 |
| Instructional program type | | | | | | | | | | |
| Mainstream English | 37 | 23 | 68.22 | 16.68 | 85.86 | 14.77 | 60.97 | 17.17 | 64.08 | 16.91 |
| English with support | 87 | 53 | 66.97 | 18.27 | 84.00 | 16.45 | 68.53 | 20.52 | 71.68 | 20.37 |
| Bilingual instruction | 39 | 24 | 76.26 | 18.82 | 89.36 | 19.79 | 75.28 | 16.64 | 88.74 | 19.83 |

Note: Means of standard scores are used to facilitate comparison to monolingual norms of the WLPB-R.

examine research question 2, the effect of home language environment on dual language change, separate MANOVAs were conducted in which home language use and maternal vocabulary were included as moderating variables. To test research question 3, the effect of the school language environment on dual language change, separate MANOVAs were conducted including school language use and instructional program type as moderators. Subsequent analyses for each model were conducted using maternal education as a covariate in MANCOVAs to adjust for group differences to test whether each independent variable accounted for variance in gains in dual language proficiencies above and beyond the effect of maternal education (see Table 3).

Results

Descriptive information on children's Spanish and English proficiencies at kindergarten and second grade, as well as means based on the levels of each moderating variable are presented in Table 2. Home language use between adults and children differed across families ranging from more English ($n = 19$; 12%), Spanish and English ($n = 85$; 52%), more Spanish ($n = 59$; 36%). Most of the variation in home language use was a result of differences in siblings using English. Maternal Spanish vocabulary knowledge ranged from low ($n = 55$; 34%), moderate ($n = 85$; 53%), and superior ($n = 20$; 13%). School language use also varied across classrooms, ranging

from only English ($n = 73$; 48%), mostly English ($n = 57$; 38%), and Spanish and English ($n = 22$; 14%). Overall, more Spanish was used among students than teachers and staff. Instructional program type varied across classrooms from mainstream English ($n = 37$; 23%), English with support ($n = 87$; 53%), and bilingual instruction ($n = 39$; 24%).

How do the children's dual language proficiencies (Spanish and English) change from kindergarten to second grade?

Children made significant gains in both Spanish and English proficiency with the largest overall gains being in English. On average, the standard scores in English increased by 1.04 *SD* and by 0.37 *SD* in Spanish. As standard scores reflect age-corrected proficiency, these increases were above and beyond what would be developmentally expected in a monolingual child. Child-level analyses examining individual differences in *W* scores (an equal interval ability scale, not normalized by age) for each language indicated that the majority (96%) of the children experienced no loss in either Spanish or English proficiency from kindergarten to second grade. For the seven children (4%) where there was a slight decrease in Spanish *W*-scores between kindergarten and second grade, follow-up analyses confirmed the difference was non-significant, small (1–9 *W*-score points), and most likely attributed to measurement error. On average, children reached age-appropriate

Table 3
MANCOVA analyses between-subject effect on change in language proficiency from kindergarten to second grade.

| | <i>df</i> | Error <i>DF</i> | <i>F</i> | <i>p</i> | η^2 |
|--|-----------|-----------------|----------|----------|----------|
| Home language use | | | | | |
| Time*Language ^a | 1 | 160 | 38.312 | .00 | .19 |
| Time*Language*Home Language Use | 2 | 160 | 4.563 | .01 | .05 |
| Time*Language*Home Language Use*Maternal Education | 2 | 159 | 4.771 | .01 | .06 |
| Maternal vocabulary knowledge | | | | | |
| Time*Language ^a | 1 | 157 | 43.182 | .00 | .26 |
| Time*Language*Maternal Vocabulary | 2 | 157 | 4.447 | .01 | .05 |
| Time*Language*Maternal Vocabulary*Maternal Education | 2 | 156 | 1.697 | .19 | .02 |
| School language use | | | | | |
| Time*Language ^a | 1 | 149 | 27.420 | .00 | .26 |
| Time*Language*School Language Use | 2 | 149 | 10.767 | .00 | .13 |
| Time*Language*School Language Use*Maternal Education | 2 | 148 | 10.270 | .00 | .12 |
| Instructional program type | | | | | |
| Time*Language ^a | 1 | 160 | 43.477 | .00 | .26 |
| Time*Language*Instructional Program | 2 | 160 | 10.495 | .00 | .12 |
| Time*Language*Instructional Program*Maternal Education | 2 | 159 | 9.927 | .00 | .11 |

^a Pillai's trace within-subject.

proficiencies (≥ 85 SS) in English ($M = 85.71$, $SD = 16.99$) but not Spanish ($M = 74.04$, $SD = 21.30$). In addition, the two-way, within-subjects MANOVA using Pillai's Trace test, the most conservative and robust test, evidenced significant dual language gains of both Spanish and English W scores from kindergarten to second grade ($F[1,160] = 38.31$, $p < .000$).

How does the home language environment relate to changes in children's dual language proficiencies?

A series of repeated-measure MANOVA analyses with a three-way interaction tested whether children differed in dual language gains over time based on factors in the home language environment. The effect of each moderating factor was also tested using a MANCOVA analysis that controlled for differences in maternal education (Table 3). Home language use was significantly associated with dual language gains from kindergarten to second grade, over and above the effect of maternal education ($F[2,159] = 4.771$, $p < .01$). Bonferroni pair-wise comparisons confirmed that children from homes where both Spanish and English were spoken made greater dual language gains than children in homes where more English was spoken. Follow up ANOVAs demonstrated that home language use was significant associated with gains in English ($p < .001$) and Spanish ($p < .001$) when considered separately. Children varied in their English and Spanish proficiency depending on how much Spanish/English was reported to be used in the home. Children from homes where more English was spoken began school with limited Spanish (48 SS) and marginal English (78 SS), and made small gains in Spanish (53 SS) and moderate gains in English (90 SS) at second grade. Children from homes where both Spanish and English were spoken began school with marginal Spanish (70 SS) and English (73 SS), and made moderate Spanish gains (76 SS) and large gains in English (89 SS) at second grade. Children from homes where mostly Spanish was spoken began school with marginal Spanish (73 SS) and limited English (62 SS), and made small gains in Spanish (78 SS) and large gains in English (80 SS) at second grade.

Although initial analyses suggested that maternal vocabulary was significantly associated with dual language gains ($F[2,157] = 4.447$, $p < .01$), the effect was non-significant after adjusting for maternal education ($F[2,156] = 1.697$, $p = .19$). Children across the three groups based on mother's Spanish vocabulary were similar in that they began school with limited Spanish (65–73 SS) and English (63–73 SS), and made small gains in Spanish (71–79 SS) and larger gains in English (79–93 SS) at second grade. Follow up ANOVAs demonstrated that maternal Spanish vocabulary was significant for English ($p < .01$) but not Spanish gains. The effect on English gains was non-significant after adjusting for maternal education ($p = .16$).

How does the school language environment relate to changes in children's dual language proficiencies?

School language use and instructional program type were both significantly associated with children's dual language gains. The 3-way interaction for time by language by school language use demonstrated that dual language gains differed by school language use ($F[2,149] = 10.767$, $p < .001$). These differences remained significant after considering the effect of maternal education ($F[2,148] = 10.270$, $p < .001$). Follow up Bonferroni pair-wise comparisons indicated that dual language gains were significantly higher in classrooms where Spanish and English were spoken, compared to classrooms where mostly English or only English were spoken. Repeated-measures ANOVAs confirmed this effect was also significant when considering gains separately for English ($p < .01$) and Spanish ($p < .001$). Children varied in their Spanish and English

proficiency depending on how much Spanish/English was observed being used in the school.

Children in classrooms where only English was spoken had limited Spanish (64 SS) and English (70 SS) at kindergarten, and made small gains in Spanish (68 SS) and large gains in English (86 SS) at second grade. Children in classrooms where mostly English was spoken had limited Spanish (71 SS) and English (67 SS) at kindergarten, and made small gains in Spanish (75 SS) and large gains in English (95 SS) at second grade. Children in classrooms where Spanish and English were spoken began school with adequate Spanish (80 SS) and English (80 SS) at kindergarten, and made large gains in Spanish (94 SS) and in English (95 SS) at second grade.

Lastly, dual language gains differed significantly by instructional program type ($F[2,160] = 10.495$, $p < .001$). These differences remained significant after considering the effect of maternal education ($F[2,159] = 9.927$, $p < .001$). Follow up Bonferroni pair-wise comparison indicated that dual language gains were significantly higher in bilingual classrooms than in mainstream English classrooms and English with support classrooms. The effect of instructional program type was significant in gains for English ($p < .05$) and Spanish ($p < .001$). Children varied in their Spanish and English proficiency depending on the instructional program type. Children in mainstream English classrooms began school with limited Spanish (61 SS) and English (68 SS), with small gains measured in Spanish (64 SS) and large gains in English (86 SS) at second grade. Children in English with support classrooms began school with limited Spanish (69 SS) and English (67 SS) at kindergarten, and made small gains in Spanish (72 SS) and large gains in English (84 SS) at second grade. Children in bilingual classrooms began school with marginal Spanish (75 SS) and English (76 SS) at kindergarten, and made large gains in Spanish (88 SS) and English (89 SS) at second grade.

Discussion

The primary purpose of this study was to investigate changes in dual language proficiencies and the role of the home and school linguistic environments during Latino children's first years of schooling (kindergarten to second grade). Based on comparisons of standard scores, these gains were beyond developmental expectations. Most groups considered in the study reached age-appropriate proficiencies (> 85 SS) in English, and some groups gained dual language age-appropriate proficiencies by second grade (Table 2). Children who were in schools where Spanish and English were used among the students and staff, and/or received instruction in both languages, made large gains (in most cases close to 1 SD) and reached age-appropriate levels of proficiencies in both Spanish and English (Fig. 2). In the other classrooms where only or mostly English was used, children made significant gains in English but not in Spanish (Fig. 1). Likewise, in both the mainstream English and the English with support classrooms, children made significant gains in English but not in Spanish. These results are consistent with previous findings that students who receive bilingual instruction tend to reach higher levels of proficiency in both Spanish and English than students in English only programs (Collier & Thomas, 2004). Children in schools where Spanish and English were used and classrooms with bilingual instruction entered school with higher levels of proficiencies in Spanish and English and made larger gains in both languages across time. These findings align with previous research indicating that dual language children who begin school with higher language abilities continue to develop each faster than children who enter with lower proficiencies (Oller & Eilers, 2002; Sparks et al., 2009). These are important findings considering that children with strong dual language proficiencies may also benefit from cognitive correlates of bilingualism (Adesope, Lavin,

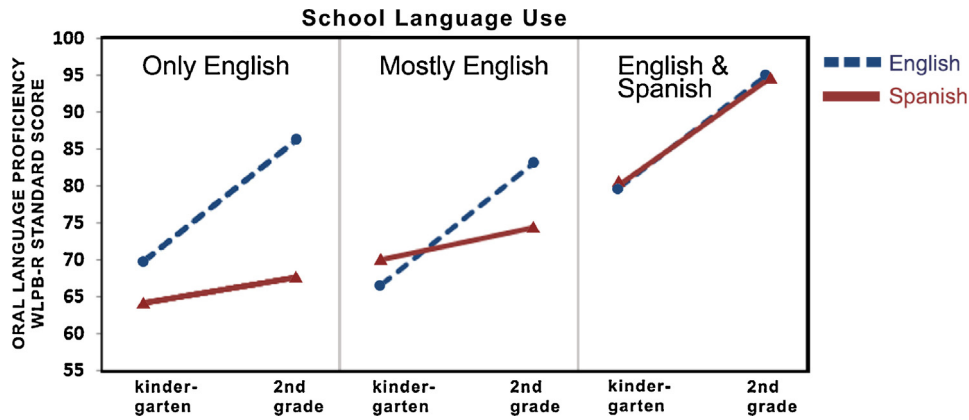


Fig. 1. Dual language gains moderated by school language use.

Thompson, & Ungerleider, 2010), such as greater metalinguistic and metacognitive skills (Bialystok, 2001), stronger symbolic representation, abstract reasoning skills (McLeay, 2003), and better learning strategies (Wilson, Dickinson, & Rowe, 2013). The benefits associated with bilingualism are mostly confined to children who have extensive bilingual experience, while those children with limited proficiency in one of their languages are not as likely to demonstrate the same cognitive advantages (Wilson et al., 2013).

Furthermore, it was not only the children who received bilingual instruction that became competent in both languages, but also children in classrooms where both Spanish and English were used among students, teachers, and staff. Beyond the language of instruction, it is how each language is used in classrooms among students and staff that is critical to understanding the development of dual language proficiency. In the present study, classrooms where children were communicating in Spanish and English made gains in both languages over time, even when most or all of the instruction was in English. This is a notable finding as many schools may not be able to provide instruction in both languages due to limitations in resources, teacher qualifications, or district policies. Nevertheless, it may be beneficial for these schools to foster a multilingual ecology that welcomes and supports the use of home languages (García, Makar, Starcevic, & Terry, 2011) in order to support dual language development. These findings may encourage monolingual English-speaking teachers with dual language students to provide resources and allow students to discuss and collaborate with peers in their home languages (García et al., 2011).

While instructional program type and school language use were significantly associated with dual language gains in the present study, factors from the home language environment did not have as

clear or strong of an effect on the types of dual language gains children made in their early school years. Home language use groups demonstrated significantly different dual language gains, however, none of these groups reached age-appropriate competences in both languages at second grade. Considerable gains in both languages were made by children from homes where more Spanish was spoken, as well as homes where both Spanish and English were used among family members. Children in homes where more Spanish was used among family members entered school with below age-appropriate proficiencies in both languages but made significant and large gains (+1.25 SD) in English. As may be expected, children in homes where more English was spoken made gains and reached age-appropriate levels of English proficiency, yet had persistently low proficiency in Spanish.

Maternal vocabulary was significantly associated with dual language gains, yet this association was no longer significant after controlling for the effect of maternal education. It is probable that mothers with higher levels of education may also have higher levels of vocabulary knowledge. In a recent study, Hammer et al. (2012) found that higher maternal education was predictive of higher vocabulary skills in English but not Spanish among dual language children. In the present study, mothers' Spanish proficiency also had a stronger effect on children's gains in English than in Spanish.

Children entered schools with a wide variance of dual language abilities which were markedly different across the schools they attended. It is necessary to point out that this study did not investigate initial group differences (intercepts), but instead analyzed change over time (slopes). However, there were differences in the initial level of Spanish and English proficiency across groups at the time of school entry. Children in the present study who began

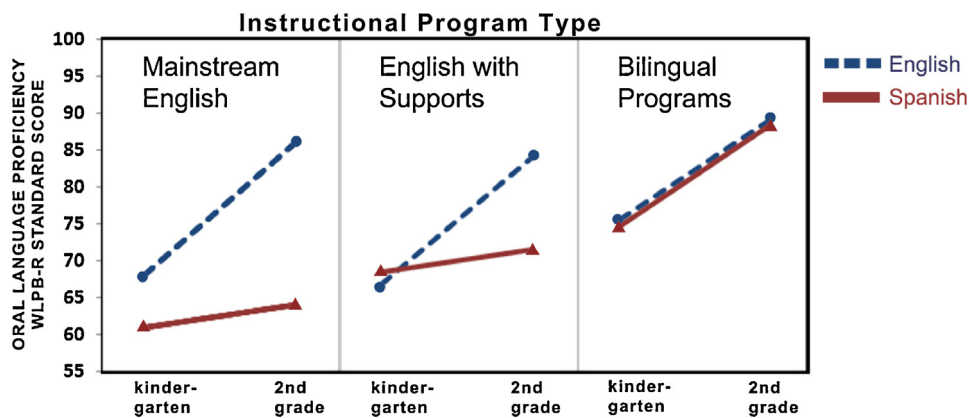


Fig. 2. Dual language gains moderated by instructional program type.

school with higher dual language proficiencies made greater gains in both languages, which also has been evidenced in other studies (Burchinal et al., 2012). In previous work, we have identified factors related to different dual language profiles at the time of school entry (Collins, O'Connor, Suárez-Orozco, Nieto-Castañón, & Toppelberg, 2014). It may be that children with higher dual language abilities purposely entered into schools with bilingual instruction in an effort to maintain and develop dual language proficiencies. The children who attended schools that supported both languages made significantly greater dual language gains than students in schools where Spanish was not used, underscoring the important role that school plays in supporting dual language development.

Ironically, it may be the school that matters most in fully developing children's home languages (García & Jensen, 2009). As school factors may be more malleable than home factors, these findings should be considered by policymakers and practitioners. The use of home language for instruction could help build competences related to greater school success for dual language learners. Latino children who are proficient in both Spanish and English have higher academic expectations and achievement than Latino children who are only proficient in English (Genesee et al., 2006; Lindholm-Leary, 2001). Regrettably, the tendency over the last decade has been for policymakers and the public to support English-only programs (García, Kleifgen, & Falchi, 2008; Menken & Kleyn, 2010). Recent educational reform efforts have resulted in a decrease in bilingual programs and mandated English-only programs in some states such as California, Arizona, and Massachusetts, where this study took place. Even in bilingual programs, many teachers have felt pressure to teach exclusively in English (Menken, 2006). Our findings show that 24% of the children were in bilingual programs, yet only 14% of classrooms were observed using Spanish and English, suggesting that English is used more often in the bilingual classrooms. This could be related to the heightened focus on accountability in schools in which testing occurs mainly in English. Consistent with prior research, in this study, we see that Spanish instruction did not delay the development of English. In fact, we found quite the opposite; children benefited from exposure to and instruction in both languages and made substantial gains in Spanish and English.

A review of research on dual language children in the U.S. acknowledged a lack of research using sound methodology to investigate the developmental aspects of dual oral language competence, while also considering language use at home and school and other contextual factors (Genesee et al., 2006). The present study adds to the literature in multiple ways and responds to recent calls for research focusing on DLLs (Castro, Páez, Dickinson, & Frede, 2011). First, our study investigates children's dual language proficiencies based on direct assessment of linguistic competence using a broad measure reflecting multiple domains and modalities of each language. As a result, we are able to investigate levels of age-appropriate language proficiencies reflective of the cognitive and language demands of the academic environment. Relatively few empirical studies have investigated the factors related to attaining age appropriate proficiencies in both languages using direct assessments of language development over time. Furthermore, many studies of bilingual children have not measured both languages of children, and few studies of DLLs have considered both languages in a single analysis to investigate development (Burchinal et al., 2012). The present study addresses this gap by considering children's gains in both languages over time.

Nevertheless, this study was subject to limitations and would be strengthened with information on children's dual language competence at later years. While this study includes direct assessment of the main outcome variables of children's Spanish and English proficiency, mothers' reports of home language use among family members were used. A direct observation of home language

use would strengthen the study. Furthermore, in community-based studies of children, there are often selection biases related to the schools that children attend and the communities where families live. The present study included specific selection criteria to limit these biases as much as possible, as well as control for factors related to SES. However, there are certainly differences across these groups which could not be controlled for due to the non-experimental nature of this study.

Conclusions

The present findings have implications regarding theories of dual language development as well as educational guidelines aimed at supporting young, Latino dual language children. In this study, a large proportion of children entered school with low proficiencies in both Spanish and English. Overall, children made substantial gains in one or both languages. However, only certain groups of children gained age appropriate proficiencies in both languages. Children in classrooms where both Spanish and English was used among students and staff, and children who received instruction in both Spanish and English reached age-appropriate levels of proficiencies in both languages. It may be important for early childhood programs to establish a connection between home and school by incorporating aspects of the home and community into the school curriculum. This would entail a concerted effort of providing professional development and training to teachers with special attention given to supportive practices for educating dual language learners, including the use of home language at school. The present findings reinforce the importance of the home and school environments as well as instructional programs that aim to develop and support children's dual language proficiencies.

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