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Expressive Vocabulary Development in Children from Bilingual and Monolingual Homes: A Longitudinal Study from Two to Four Years

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Abstract

The early course of language development among children from bilingual homes varies in ways that are not well described and as a result of influences that are not well understood. Here, we describe trajectories of relative change in expressive vocabulary from 22 to 48 months and vocabulary achievement at 48 months in two groups of children from bilingual homes (children with one and children with two native Spanish-speaking parents [$n_s = 15$ and 11]) and in an SES-equivalent group of children from monolingual English homes ($n = 31$). The two groups from bilingual homes differed in their mean levels of English and Spanish skills, in their developmental trajectories during this period, and in the relation between language use at home and their vocabulary development. Children with two native Spanish-speaking parents showed steepest gains in total vocabulary and were more nearly balanced bilinguals at 48 months. Children with one native Spanish- and one native English-speaking parent showed trajectories of relative decline in Spanish vocabulary. At 48 months, mean levels of English skill among the bilingual children were comparable to monolingual norms, but children with two native Spanish-speaking parents had lower English scores than the SES-equivalent monolingual group. Use of English at home was a significant positive predictor of English vocabulary scores only among children with a native English-speaking parent. These findings argue that efforts to optimize school readiness among children from immigrant families should facilitate their access to native speakers of the community language, and efforts to support heritage language maintenance should include encouraging heritage language use by native speakers in the home.

Keywords

bilingual development; immigrant families; Spanish-English bilinguals; language trajectories; heritage language maintenance; expressive vocabulary

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Worldwide, the number of children who hear and begin to acquire two languages in the preschool years is large and growing. Often these are children of immigrant families, in which one or both parents is foreign born (Hernandez, Denton, & Macartney, 2008). The languages these children hear are the language of the dominant culture and their family's heritage language. Two concerns have long been voiced about the language development of children growing up in such bilingual environments. One is how to support the children's acquisition of the heritage language; the second is how to ensure that the children have the skills in the language of the dominant culture they will need to be successful in school (Tsai, Park, Liu, & Lau, 2012; Winsler, Díaz, Espinosa, & Rodríguez, 1999). Both concerns are well founded.

Heritage language loss is a common phenomenon among second-generation immigrants, despite the desire among many immigrant parents for their children to acquire their language (Eilers, Pearson, & Cobo-Lewis, 2006; Wong Fillmore, 1991). Poor skills in their parents' language have negative consequences for the children's social adaptation and for family relationships (Oh & Fuligni, 2010; Tseng & Fuligni, 2000). Children of immigrants who do not acquire their parents' heritage language have also lost the opportunity to be bilingual, with its attendant cognitive, personal, and economic advantages (Bialystok, 2009).

Reaching school age with poor community language skills is also a common phenomenon among children from immigrant families in the U.S. and elsewhere (Castro, Páez, Dickinson, & Frede, 2011; Hernandez & Napierala, 2012; Scheele, Leseman, & Mayo, 2010), and that too has negative consequences. In the U.S., there is clear evidence that low levels of English skills at school entry place children at risk for academic failure—a risk that is not eliminated by currently provided programs for children who enter school with limited English proficiency (Halle, Hair, Wandner, McNamara, & Chien, 2012; Han, 2012; Kieffer, 2012).

Research on monolingual children has established that language skills have their roots in early experience (Hoff, 2006) and, further, that individual differences in early trajectories predict individual differences in skill level at school entry (Rowe, Raudenbush, & Goldin-Meadow, 2012). Less is known about development in bilingual environments. The nature of the language skills that result from simultaneous exposure to two languages is not well described, and the processes that create individual differences in bilingual skills are not well understood. There is a growing body of research on the processes of bilingual development in infancy (Sebastián-Gallés, 2010; Werker, 2012), and there is a substantial and growing body of research on bilingual children in schools and programs such as Head Start beginning at the age of four years (Durguno lu & Goldenberg, 2011; Goldstein, 2012; Hammer, Hoff, Uchikoshi, & Gillanders, 2014). There is less research, however, on the paths of language development followed by young bilinguals from infancy to age four or on the factors that shape those paths (Hammer et al., 2014; McCardle & Hoff, 2006).

The present study begins to address this gap in our knowledge of how bilingual environments shape language trajectories with a follow up at four years of age of children from Spanish-English bilingual homes and a comparison group of English-monolingual children who were previously studied at 22, 25, and 30 months (Hoff et al., 2012; Place &

Hoff, 2011). The starting point for the current study is the earlier finding that the average rate of total expressive vocabulary growth of children who were simultaneously acquiring two languages was comparable to that of the monolingual children, but when only their English skills were considered, the bilingually-developing children lagged behind the monolinguals. Similar findings of initially slower rates of single language growth in young bilinguals have been observed across a variety of languages and bilingual contexts—the latter including both bilingualism as an immigrant phenomenon, as in the U.S., and nationally supported, stable bilingualism, as in Quebec, Canada, and parts of Wales (Bialystok & Feng, 2011; Gathercole & Thomas, 2009; Marchman, Fernald, & Hurtado, 2010; Patterson & Pearson, 2004; Pearson, Fernández, & Oller, 1993; Silvén, Voeten, Kouvo, & Lundén, in press; Thordardottir, Rothenberg, Rivard, & Naves, 2006; Vagh, Pan, & Mancilla-Martinez, 2009). There are also, however, studies that found no difference when bilingual children were compared to monolingual children with respect to development in the language both groups were acquiring (De Houwer, Bornstein, & Putnick, 2013; Smithson, Paradis, & Nicoladis, in press). The factors that might explain these different findings are not clear. Understanding sources of variance in outcomes of bilingual development within a single sample may contribute to explaining the variable findings in the literature as a whole.

The previous finding that language growth in each language is slower when children's language experience is divided between two languages should not be surprising, because a relation between the amount of speech children hear and their rates of language development is well documented in studies of children in monolingual environments (Hart & Risley, 1995; Hoff, 2006; Huttenlocher, Haight, Bryk, Seltzer, & Lyons, 1991). Children in bilingual environments must, on average, hear less of each language. But, as already noted, the findings in the literature are inconsistent and further, the findings of an early difference between monolingual and bilingual children in single language knowledge raises the question of how bilingually-developing children ever become bilingual adults. The language knowledge of bilingual adults is not equal to that of a monolingual but divided between two languages. At some point, the rate of gaining language knowledge must become greater in those who become bilingual.

In the present study, we compare the relative trajectories of expressive vocabulary development in children who were raised from birth in bilingual environments and children raised in monolingual environments to ask if, by four years of age, the children from bilingual environments were gaining over children from monolingual environments in total vocabulary development. Although these children were lagging in single-language development at 30 months (Hoff et al., 2012), it may be that after an initially slow start, the bilingually-developing children achieve skill levels in two languages that are equivalent to monolingual skill levels. Clearly, bilingualism is within the human language acquisition capacity (Genesee & Nicoladis, 2007), and some studies find that bilingual children who may lag in early development later achieve skill levels comparable to those of monolingual children (Gathercole & Thomas, 2009; Thordardottir, 2011).

Some findings suggest, however, that outcomes other than successful bilingual development are possible. One prediction also suggested in the literature is that the bilingually developing

children might achieve levels comparable to monolinguals in English but decline, in relative terms, in Spanish. In the U.S., Spanish is a minority language that is less prestigious than English (Eilers et al., 2006). The process of the majority culture language becoming dominant and skills in the minority language declining has been documented in several groups (Gathercole & Thomas, 2009; Jia & Aaronson, 2003; Kohnert, 2002). Although this process has usually been observed when children enter school and exposure to the dominant language increases, the process could begin earlier at home if use of the community language increases in the home--as has been documented to occur when children have more out-of-home activities and when older siblings enter school (Bridges & Hoff, 2014; Prevoo, Mesman, Van IJzendoorn, & Pieper, 2011). The children from bilingual homes in this study were all acquiring Spanish, but, on average, they were already more advanced in English vocabulary and grammar than in Spanish vocabulary and grammar at 22 months (Hoff et al., 2012). The question we ask here is how well their Spanish acquisition continues.

A third possibility suggested by previous research is that the outcome of bilingual exposure will differ depending on the constellation of language backgrounds of the children's parents. In a study of 6- to 11-year-old children from dual-language households in the Dutch-speaking region of Belgium, De Houwer (2007) found that children who had two parents who spoke a minority language were more likely to be bilingual in that language and Dutch than children who heard the minority language from only one of their parents. Data on a subset of the children in the current sample also suggest that the constellation of parents' language backgrounds is relevant to dual language use at home and to children's bilingual outcomes (Place & Hoff, 2011). Perhaps not surprisingly, this previous study found that the children with two native Spanish-speaking parents heard more Spanish at home than the children with one native English-speaking parent and one native Spanish-speaking parent, and that their Spanish skills were more advanced (Place & Hoff, 2011).

In addition to testing these three predictions with respect to the longer-term outcomes of early bilingual exposure, the present study asks about the continuing role of home language practices in talk to children in bilingual children's language development. While studies of early bilingual development consistently find that the relative amount of speech addressed to children is a strong predictor of children's skill development in both languages (Gathercole & Thomas, 2009; Hoff et al., 2012; Pearson, Fernández, Lewedeg, & Oller, 1997; Saunders & O'Brien, 2006), studies of older children sometimes reach a different conclusion. Several sources argue that children's acquisition of the majority language is a certainty and that home language use has its primary influence on the acquisition of the heritage language (De Houwer, 2007; Gathercole & Thomas, 2009). A particularly relevant finding in that regard is the finding that among a sample of children from Spanish-speaking homes who were attending Head Start programs, mothers' increases in their use of English in the home during that period were unrelated to the children's English skills, although they were negatively related to the children's skills in Spanish (Hammer, Davison, Lawrence, & Miccio, 2009). The interpretation offered is that the children had sufficient exposure to English through Head Start, that maternal language use had no effect on their English language development. Another proposal is that in bilingual environments, language input accounts for more of the variance in the earliest stages of language development than it does later, because language

output (i.e., the children's use of the language in production) becomes an additional source of variance later (Bohman, Bedore, Peña, Mendez-Perez, & Gillam, 2010).

A thorough literature review on factors related to bilingual outcomes would also include mention of socioeconomic status (SES) and gender. SES has well-established effects on the rate of language development, with children from lower-SES backgrounds showing slower rates of language development and thus lower levels of language skill at every age (Hoff, 2006; 2013a). Findings from national studies that low-income children from language minority homes lag behind their monolingual peers (Castro et al., 2011) unavoidably reflect effects of both SES and bilingualism, in proportions that can be difficult to determine. In the present sample, the bilingual families were high-SES and equivalent to the monolingual families in levels of parental education, thus we do not examine effects of SES here. Rather, we use the comparability of the monolingual and bilingual samples to isolate the effects of bilingual exposure from effects of SES. Gender has also been argued to play a role in bilingual development. There is evidence that mothers use the heritage language with their young daughters more than with their sons (Hammer, Lawrence, Rodriguez, Davison, & Miccio, 2011) and that as older children and adults, daughters are more likely to maintain the family's heritage language than are sons (Portes & Hao, 2002). In the present sample, there was no evidence of gender differences in experience or language development up to 30 months, but we examine gender differences here at 48 months.

The Present Study

One purpose of the present study was to ask how children from different bilingual home language environments compare to each other in terms of trajectories of change in relative skill levels from 22 to 48 months and absolute levels of achievement at 48 months with respect to measures of expressive vocabulary in each language and in both languages considered together. A second purpose was to compare the children from bilingual environments to children from monolingual English-speaking homes with respect to those same outcomes. Expressive vocabulary in English is one component of the oral language skills that predict reading success in monolingual and bilingual children (Kieffer, 2012; Scarborough, 2002; Storch & Whitehurst, 2002), and the English oral language skills of language-minority students at school entry are significant predictors of their future academic success (Halle et al., 2012; Han, 2012; Kieffer, 2008, 2012). Thus, understanding sources of variance in language-minority children's oral language skills at 48 months is of considerable importance. The participants in this study were participants in an earlier investigation of bilingual and monolingual development from 22 to 30 months (Hoff et al., 2012; Place & Hoff, 2011). Three findings from that investigation motivate the current research questions. The first finding was that from 22 to 30 months, the bilingual children lagged behind the monolingual children in English language development, while they appeared to be no different from the monolingual children in terms of a measure of total language knowledge that combined their knowledge of English and Spanish (Hoff et al., 2012). The second finding was that individual differences among the bilingual children in their levels of English and Spanish skill were significantly related to differences in the balance of their English and Spanish exposure (Hoff et al., 2012; Place & Hoff, 2011). The third finding was that parents' language backgrounds were a systematic source of variance in the balance of

English and Spanish use in the home and, therefore, in the balance of children's English and Spanish skill: children with two native Spanish-speaking parents heard and acquired more Spanish than children with one native English-speaking and one native Spanish-speaking parent (Place & Hoff, 2011).

In the present study, we make use of new data collected at 48 months on 26 bilingual children and 31 monolingual children from that earlier investigation who could be located and were willing to participate. We assess achievement levels at 48 months and analyze growth trajectories during the period from 22 to 48 months, making use of the new data collected at 48 months and incorporating previously collected data only for the children in this subsample who were available for follow up. The research questions asked in the present analyses were the following:

1. At 48 months, is there evidence in language growth trajectories that children from bilingual homes are acquiring total expressive vocabularies at a faster rate than monolingual children (as they must eventually if they are to become proficient bilinguals)?
2. At 48 months, is there evidence in language growth trajectories that children from bilingual homes are continuing to acquire Spanish expressive vocabularies as well as English expressive vocabularies, and how do English and Spanish growth contribute to total vocabulary growth in the children from bilingual homes?
3. At 48 months, do the children from bilingual homes differ from monolingual norms and/or from the SES-equivalent monolingual comparison group in their English expressive vocabularies?
4. Does the balance of English to Spanish use in bilingual homes change over the period from child age 22 to 48 months, and are there corresponding changes in children's language dominance?
5. Does the relation of home language use to children's English and Spanish vocabulary knowledge change between 22 and 48 months?

For all of these research questions, we asked whether the answer was different depending on whether the children from bilingual homes had two native Spanish-speaking parents or one native Spanish-speaking parent and one native English-speaking parent.

Method

Participants

The participants in this follow-up study were 31 children from monolingual-English homes (14 girls and 17 boys); 15 children from bilingual homes in which one parent was a native Spanish speaker and one parent was a native speaker of English only (10 girls and 5 boys; in 11 of the families the mother was the native Spanish speaker), and 11 children from bilingual homes in which both parents were native Spanish speakers (5 girls and 6 boys). Five of the parents who were classified as native Spanish speakers described themselves as native Spanish-English bilinguals. They were grouped with those who described themselves as native Spanish speakers because of their own language backgrounds--both of their parents

were native Spanish speakers and/or they were born in a Spanish-speaking country. Thus, the distinction made among parents in bilingual homes was between those who were native speakers of English only and those who were native speakers of Spanish, with some of the native Spanish speakers being also native in English.

In the monolingual households, all parents described themselves as native speakers of English only, except for two fathers who were native Spanish speakers but who were proficient in English and who reported using only English in talking to their children. In the bilingual households with one native Spanish-speaking parent and one native English-speaking parent, 11 of the native Spanish speakers were mothers (two of these were native Spanish-English bilinguals) and four were fathers. In the bilingual households with two native Spanish-speaking parents, one of the mothers and two of the fathers were native Spanish-English bilinguals. All but two of the native Spanish-speaking parents (who were from different households) described themselves as also proficient in English. Six of the 15 native English-speaking parents in bilingual households described themselves as also proficient in Spanish. Thus, most parents in the bilingual households spoke some English and Spanish.

Of the 31 children from monolingual households, 20 were European Americans, 3 were African Americans, 3 were Hispanic, 1 was Asian, and 4 were of another ethnicity according to caregiver report. All of the children from dual-language homes were Hispanic. All groups were highly educated: in the monolingual, bilingual with one native Spanish parent, and bilingual with two native Spanish parent groups, the percent of mothers who were college graduates was 80, 80, and 100, respectively. The percent of fathers who were college graduates was 74, 60, and 82 respectively. Thirty-five percent of the children from monolingual homes had older siblings; 47 percent of the children with one native Spanish parent and 45 percent of the children with two native Spanish parents had older siblings. Of the 37 native Spanish-speaking parents, including native Spanish-English bilinguals (22 mothers and 15 fathers), 26 were born in South American or Caribbean Spanish-speaking countries; 11 were born in the U.S.

These children were those participants in an earlier study (Hoff et al., 2012) who were available for follow up at 48 months. Approximately half the families of the original study were found and agreed to participate (31 of 56 monolingual families, and 26 of 47 bilingual families). There were no significant differences between those lost and those available at 48 months in terms of English vocabulary at 22 months or, for the bilingual participants, in terms of Spanish vocabulary or balance of English to Spanish language exposure. The direction of the nonsignificant differences was for the retained participants to be more advanced in English and Spanish vocabulary than the participants who were not available. With the exception of one child who was not available for testing at 25 months, all participants available at 48 months also provided data on child language skill at each previous assessment point. Data on home language exposure were previously collected on all children only at 22 and 30 months. Participants were originally recruited through advertisements in newspapers and magazines aimed at parents, through preschools, childcare facilities, libraries, and online throughout the university community. The requirement for the children from bilingual homes was that they had been exposed to both

English and Spanish since birth and that the less-frequently heard language constituted at least 10% of their language exposure, based on caregiver report. The purpose of this very liberal criterion was to allow asking about child language outcomes in the full range of dual-language environments that exist. All of the participants were producing words in both languages at 22 months. They were all healthy, had normal hearing, and appeared to be developing normally (Hoff et al., 2012). All children in the present sample lived in two-parent households. The children's mean ages at each assessment point are presented in Table 1.

Procedure and Instruments

The data were collected over the course of several separate sessions at each child age. Most sessions were conducted in the participants' homes; a few participants chose to come to the university lab instead. Caregivers were compensated for their participation, and children received a small age-appropriate gift.

Estimates of the relative use of English and Spanish in the home with the target child were obtained from the primary caregiver (56 mothers; 1 father) at 22, 30, and 48 months in the context of an extensive interview conducted in the language of caregiver's choice by a fluent bilingual examiner. The validity of these estimates has been corroborated using data from language diaries in which mothers recorded the language(s) addressed to their children for every half-hour block of seven days (Place & Hoff, 2011). The mean percent of language addressed to the child that was in English is presented for each group at each child age in Table 2.

Measures of expressive vocabulary at 22, 25, and 30 months were obtained using the MacArthur-Bates inventories. These are caregiver-report vocabulary checklists which have parallel forms for English (the MacArthur-Bates Communicative Development Inventory [CDI]; Fenson et al., 2007) and Spanish (Inventario del Desarrollo de Habilidades Comunicativas [IDHC]; Jackson-Maldonado et al., 2003) and which have established reliability and validity for monolingual and bilingual populations (Fenson et al., 2007; Jackson-Maldonado et al., 2003; Marchman & Martínez-Sussmann, 2002). When possible, English and Spanish native speakers completed the English and the Spanish versions, respectively; otherwise, a caregiver who was a proficient Spanish-English bilingual completed both inventories.

The measure of expressive vocabulary at 48 months came from examiner administration of the Expressive One Word Picture Vocabulary Test (EOWPVT; Brownell, 2000, 2001). The MacArthur-Bates inventories used at 22, 25, and 30 months are designed for use only up to the age of 30 months, and thus a different instrument was necessary to assess expressive language at 48 months. The English version (Brownell, 2000) was administered to the monolingual participants, and the Spanish-English bilingual version (Brownell, 2001) was administered to the participants from bilingual homes. (The bilingual version was normed on a U.S. national sample of Spanish-English bilinguals and differs from the English version in the omission of items that might be considered specific to American culture.) The standard administration procedure for the Spanish-English bilingual version is to allow the child to provide a label in either language, but we modified this procedure to allow only English

labels in the English assessment and only Spanish labels in the Spanish assessment in order to obtain separate assessments of the children's English and Spanish vocabularies, as have others (Anthony, Solari, Williams, Schoger, & Zhang, 2009). We also modified the procedure to not require achieving a basal because we found many of the children from bilingual environments missed items within the first eight items, but they were able to continue successfully beyond those first items. Thus, raw scores on the EOWPVT were the total number of pictures the child labeled correctly starting from the beginning of test until he or she missed six consecutive items. The EOWPVT was administered to the children from bilingual homes by a trained bilingual examiner in English and Spanish, on separate days in counterbalanced order. The validity of the EOWPVT as we have administered it and its comparability to the CDI as an index of expressive vocabulary is supported by findings that the two measures were highly correlated in a different sample of monolingual and bilingual 30-month-olds who were administered both instruments as part of another ongoing project in our lab ($r [153] = .80, p < .001$; Place & Hoff, 2013).

Data Analysis Approach

As a preliminary step in the data analyses, we looked for gender differences in language use in the home, in English vocabulary scores, and in Spanish vocabulary scores at 48 months. There were none; independent sample *t*-tests yielded $ps > .8$. Having also found no gender differences in previous analyses of the data at earlier time points, we did not include gender as a variable in any further analyses.

Analysis of Total Vocabulary trajectories was carried out for all three groups. For the two bilingual groups, the measure of Total Vocabulary was the sum of their English and Spanish scores; for the monolingual group, the measure of Total Vocabulary was their English vocabulary score. The outcome entered into analysis was the *z*-score for Total Vocabulary, with *z*-scores calculated on the entire sample. Analyses of trajectories for English vocabulary and Spanish vocabulary were carried out for the two bilingual home language groups, using *z*-scores calculated only on the bilingual children as the outcome variables. Finally, an analysis of English vocabulary trajectories was carried out for all three groups, using *z*-scores calculated on the entire sample. *Z*-scores were used as the outcome measures in all these trajectory analyses because there is no single instrument that could be used with children across the developmental period of this study; thus it was not possible to describe change in vocabulary size over time for each group. The use of *z*-scores allowed describing change over time in the groups' relative vocabulary size. This approach has been used elsewhere to allow modeling of longitudinal data despite the use of different instruments (Lewis et al., 2007). For each outcome, we used a linear mixed model with Age nested within child and measured in months. We included random effects for both intercept and Age. We centered at 22 months, so Age is modeled as age in months minus 22. In these models, there should never be a fixed effect of Age because *z*-scores have a mean of 0 at each age. A fixed effect of Language Group would indicate differences in the relative position of the groups averaged across all ages. An Age $\times$ Language Group interaction would indicate changes between or among groups in their relative positions over time. Analyses were run in SPSS 20.0; figures of the estimated trajectories were produced using Stata 12.0.

Analyses of English vocabulary achievement at 48 months were accomplished using EOWPVT percentile scores as the outcome measure and ANOVA to compare groups. Percentile scores allowed the comparison of each group to monolingual norms—in addition to comparing the groups to each other. Although the application of monolingual norms to bilingual children is inappropriate for purposes of estimating children's language learning capacities (Hoff, Core, Rumiche, & Señor, 2013), comparison of bilingual children to monolingual norms is widely and legitimately used in investigating the effect of learning two languages on the rate of learning each one (Petitto et al., 2001; Paradis & Kirova, in press). Analysis of the balance of English and Spanish vocabulary was accomplished using EOWPVT raw scores in each language, which provided a direct comparison of the number of items for which the children had labels in each language. ANOVA was used to assess the effects of language and bilingual group.

For the children from bilingual homes, analyses of change over time in language use in the home was accomplished by comparing time points with respect to the percent of total language use with the child that was in English, according to caregiver report. Analyses of change over time in the children's language balance was accomplished by comparing time points with respect to the percent of children's total vocabulary scores that was contributed by their English vocabulary score. Finally, the relation of home language exposure to these children's English and Spanish vocabulary scores at each time point was accomplished using Pearson product moment correlations.

Results

Trajectories of Total Vocabulary Growth for Children from Monolingual and Bilingual Homes

The first analysis addressed the question of whether the trajectories of relative total vocabulary growth from 22 to 48 months suggested that the children from bilingual homes were acquiring total expressive vocabularies at a faster rate than the monolingual children. Figure 1 plots relative change in Total Vocabulary for the children from monolingual English-speaking homes, the children from bilingual homes with one native Spanish-speaking and one native English-speaking parent, and the children from bilingual homes with two native Spanish-speaking parents. Models fit on the Total Vocabulary measure for these three groups showed no significant fixed effect of Age, $F(1, 57.23) = .62, p = .44$, or Language Group, $F(2, 57.17) = 1.65, p = .200$, and a significant Age $\times$ Language Group interaction, $F(2, 57.19) = 5.73, p = .005$. On average, over the period from 22 to 48 months, the monolingual children and the two groups of children from bilingual homes did not differ in their total vocabulary knowledge. However, the children from bilingual homes with two native Spanish-speaking parents differed from the other two groups in their rate of total vocabulary growth, gaining in relative position over time ($ps < .01$).

Trajectories of English and Spanish Expressive Vocabulary Growth for Children from Monolingual and Bilingual Homes

The next analyses asked whether the children from the two types of bilingual homes differed in their growth of English and Spanish expressive vocabularies, relative to each other, and

whether they differed in English growth relative to the monolingual children. Figures 2a and 2b plot relative change in English and Spanish vocabulary for the two bilingual groups. Models fit on English vocabulary (Figure 2a) showed no effect of Age, $F(1, 26.14) = .06$, $p = .82$, a significant fixed effect of Language Group, $F(1, 26.06) = 8.67$, $p = .007$, and no significant Age $\times$ Language Group interaction, $F(1, 26.14) = 1.06$, $p = .31$. That is, the children with one native English-speaking parent and one native Spanish-speaking parent consistently had larger English vocabularies than did the children with two native Spanish-speaking parents, and the size of that difference, expressed in z -scores, did not change over the time period studied. Models fit on Spanish vocabulary for the two groups from bilingual homes (Figure 2b) showed no significant main effect of Age or Language Group, F 's $< .40$, $ps > .50$, and a significant Age $\times$ Language Group interaction, $F(1, 26.07) = 5.92$, $p = .022$. These findings indicate that the children with two native Spanish-speaking parents gained over this time period in Spanish skill relative to children with one native Spanish-speaking parent.

Figure 3 plots relative change in English vocabulary for all three groups of children, using z -scores calculated on the entire sample. Models fit on this measure for all three groups showed a significant fixed effect of Language Group, $F(2, 57.15) = 11.92$, $p < .001$, and no significant Age or Age $\times$ Language Group interaction, F s $< .20$, $ps > .70$. Bonferroni-Holm adjusted comparisons indicated that across ages, children in homes with two native Spanish-speaking parents had significantly smaller English vocabularies than children in monolingual homes (adjusted $p < .001$) or homes with one native Spanish-speaking parent (adjusted $p = .012$), and children in homes with one native Spanish-speaking parent had smaller English vocabularies than children in English monolingual homes (adjusted $p = .040$) (Aiken & Gensler, 1996).

English Expressive Vocabularies at 48 Months for Children from Monolingual and Bilingual Homes

The next analyses investigated absolute achievement levels at 48 months in the two bilingual groups and one monolingual group. The mean percentile scores for the test of English expressive vocabulary administered at 48 months are presented in Figure 4. Both groups of children from bilingual homes had English vocabulary scores near or above the 50th percentile. The children from bilingual homes with one native Spanish- and one native English-speaking parent had a mean English percentile score of 63.73 ($SD = 19.74$); the children from bilingual homes with two native Spanish-speaking parents had a mean English percentile score of 45.91 ($SD = 36.06$). The monolingual children in this high-SES sample, however, had a mean percentile score of 79.84 ($SD = 19.74$). One-way ANOVA with Language Group (Monolingual, Bilingual with 1 native Spanish-speaking parent, Bilingual with 2 native Spanish-speaking parents) as a between-subjects variable revealed a significant effect, $F(2, 54) = 6.50$, $p = .002$, $\eta_p^2 = .19$. Post hoc Bonferroni-Holm comparisons (Aiken & Gensler, 1996) indicated that the monolingual children scored significantly higher than the children with two native Spanish-speaking parents ($p = .002$); the children with one native Spanish-speaking parent were not significantly different from either other group.

Change over Time in the Balance of English and Spanish Home Language Use and in Children's Vocabularies

The next analyses asked whether the balance of English to Spanish use in talk to the children in bilingual homes changed over the period from child age 22 to 48 months and whether there were corresponding changes in the balance of English and Spanish words in the children's total vocabularies. Analyses of the percent of language use in the home that was in English, presented for each group in Table 2, revealed that within each bilingual home group, individual differences in the relative use of English were stable (correlations among measures at all three time points ranged from .4 to .9), and mean levels of English use in the home for each group did not change from 22 to 30 months. From 30 to 48 months, use of English increased significantly in the homes with one native Spanish-speaking parent, $t(14) = 2.72, p = .02$, two-tailed, and marginally significantly in the homes with two native Spanish-speaking parents, $t(9) = 1.92, p = .09$, two-tailed.

Means for the proportion of total vocabulary scores contributed by their English vocabulary score (i.e., English score/[English score + Spanish score]) are presented for each group of children from bilingual homes at 22, 25, 30, and 48 months in Table 3. Individual differences were highly stable from 22 to 30 months (all r s > .9) and were somewhat less stable but still significantly correlated from 30 to 48 months, $r(n=15) = .48, p = .06$, two-tailed, and $r(n=10) = .65, p = .04$, two-tailed, for the two groups, respectively. For the children with one native Spanish- and one native English-speaking parent, their English score made up more than 50 percent of their total vocabulary score at every time point, and that proportion increased significantly over each interval, $t(14) = 2.60, p = .02$; $t(14) = 2.66, p = .02$, and $t(14) = 4.74, p < .001$, respectively. For the children with two native Spanish-speaking parents, their Spanish score made up more than 50 percent of their total score at each time point between 22 and 30 months, and that proportion did not change between 22 and 30 months. Between 30 and 48 months, in contrast, the proportion of their total vocabulary scores accounted for by English vocabulary did increase significantly, $t(9) = .24, p = .04$, two-tailed, and at 48 months more than 50 percent of their total vocabulary score came from their English vocabulary score.

Comparisons of the raw English and Spanish vocabulary scores for the two groups of children from bilingual homes asked whether the difference between English and Spanish raw scores at 48 months was significant and whether the size of the difference differed as a function of group. A 2 (Language) $\times$ 2 (Language Group) mixed ANOVA with Language (English, Spanish) as a within-subjects variable and Language Group (Bilingual one native Spanish-speaking parent, Bilingual two native Spanish-speaking parents) as a between-subjects variable revealed a significant main effect of Language, $F(1, 24) = 36.87, p < .001, \eta_p^2 = .61$, indicating that, on average, the children knew significantly more English words than Spanish words. There was no significant main effect of Language Group, $F(1, 24) < 1$. There was a significant Language $\times$ Language Group interaction, $F(1, 24) = 9.48, p = .005, \eta_p^2 = .28$, indicating that the size of the difference between English and Spanish vocabularies was greater for the children from homes with one native Spanish-speaking parent than for the children with two native Spanish-speaking parents. The mean raw scores in English and Spanish at 48 months are presented in Figure 5 for both groups of children

from bilingual homes. (The English scores for the monolingual group are also presented in the figure, but they are not analyzed.)

The Relation of Home Language Use to English and Spanish Vocabulary at 22, 30, and 48 Months

The final set of analyses asked, for children with one and with two native Spanish-speaking parents, whether the relation of home language use to children's English and Spanish vocabulary knowledge changed between 22 and 48 months. The correlations between English use in the home and children's English and Spanish vocabulary scores at 22, 30, and 48 months are presented for these groups of children from bilingual homes in Table 4. Relative use of English in the home showed a strong, significant positive relation to English vocabulary at every time point for children with one native Spanish-speaking and one native English-speaking parent. Use of English at home was less consistently and never significantly related to English vocabulary for children with two native Spanish-speaking parents. Relative use of English in the home was a marginally significant negative predictor of children's Spanish skills among children with one native Spanish-speaking and one native English-speaking parent at 30 months only. In contrast, use of English in homes with two native Spanish-speaking parents was a significant negative predictor of children's Spanish vocabulary at 48 months, and a marginally significant negative predictor at 22 and 30 months.

Discussion

Data from this longitudinal study of children raised with exposure to two languages from birth provide new evidence regarding how children from bilingual homes differ from each other and differ from monolingual children in the early course of expressive vocabulary development and in the skills they have achieved by the age of four years. These data also provide new evidence regarding factors that create variability in the outcomes of early bilingual exposure. We discuss the findings as they address the research questions with which we began.

Trajectories of Total Vocabulary Growth

The first question we asked of the data was whether, by the age of 48 months, the children from bilingual homes were acquiring total expressive vocabularies at a faster rate than monolinguals. The findings indicated that some were and some were not. Analyses of trajectories of changes in relative Total Vocabulary over time showed that the children from bilingual homes with two native Spanish-speaking parents were gaining over the monolingual children, but the children from bilingual homes with only one native Spanish-speaking parent were not.

Components of Trajectories of Total Vocabulary Growth in Children from Bilingual Homes

The second question we asked was how English and Spanish growth contributed to total vocabulary growth in the children from bilingual homes. Analyses of relative English trajectories for all children and relative Spanish trajectories for the two groups of children from bilingual homes suggested why the children with two native Spanish-speaking parents

were growing in total vocabulary relative to the other groups. They were maintaining their relative position with respect to English while also making relative gains in Spanish. The other two groups of children were maintaining their relative positions in English, but the children from monolingual homes were learning no Spanish and the children from homes with one native Spanish-speaking and one native English-speaking parent were learning less Spanish than the children with two native Spanish-speaking parents.

In particular, we wanted to know whether, at the age of 48 months, these children from bilingual homes were continuing to acquire Spanish. Lack of a comparable test at the earlier ages means we cannot know how much Spanish any of the children were continuing to learn in absolute terms. However, the finding of relative decline of Spanish skills in the children with one native Spanish-speaking parent, relative to the children with two native Spanish-speaking parents, is consistent with De Houwer's (2007) finding that having two minority language speakers in the home was the family constellation most associated with children having skills in both languages between 6 and 11 years. They are also consistent with Hakuta and D'Andrea's (1992) finding of higher heritage language skills among adolescents with two foreign-born parents compared to those with one foreign-born parent.

Another conclusion suggested by the comparison of English trajectories between these two groups of children from bilingual homes is that the relative gains over time in Spanish vocabulary by the children with two native Spanish-speaking parents did not come at the expense of English vocabulary development, nor was the relative decline in Spanish skills among the children with one Spanish-speaking parent associated with any relative gain in English.

English Achievement at 48 Months

The third question we asked was how the English language achievement of the children from bilingual homes compared to that of monolingual children at 48 months. One could argue that this is a misguided question, that a comparison of bilinguals' knowledge in one of their languages to monolinguals' total language knowledge is not meaningful. When children enter school, however, that is exactly the comparison that is made--sometimes directly in assessments of children for placement and always indirectly, when the curriculum is provided in English. One aim of this study was to identify factors that affect bilingual preschool children's preparedness for the comparisons that are to come. The application of monolingual norms to the bilingual children was not done to evaluate to the bilingual children's capabilities but to gauge how they will fare with the monolingually based expectations of English-language schooling.

The findings indicated that the average score of children from high-SES bilingual homes was close to or above monolingual norms, but the scores of the children with two native Spanish-speaking parents were significantly lower than those of the monolingual English-speaking children from equivalent socioeconomic backgrounds. Because a different assessment instrument, developed with a different norming group, was used at the earlier time points, we cannot compare percentile scores across ages. Thus we cannot say whether these bilingual children were closing the gap relative to monolingual norms.

The gap between the monolingual children and the bilingual children in majority language skills at 48 months, which was observed here only for the bilingual children with two native Spanish-speaking parents, is consistent with other findings in the literature. Gathercole and Thomas (2009) report that in Wales, Welsh-English bilingual children close the gap with monolingual children in their English language skills only between the ages of 9 and 11 years. The present findings are consistent with the ubiquitous finding in the U. S. that children from bilingual homes enter school with lower English language skills than children from monolingual homes. Because the present sample of bilingual homes with two Spanish-speaking parents was relatively high SES and the children were exposed to both languages from birth, the present findings argue that the widely-observed bilingual gap is not solely a function of SES or late exposure to English. The finding that among high-SES children, there are differences between monolingual and bilingual children in their English skills is also consistent with findings from Oller and Eilers's (2002) study of Spanish-English bilingual kindergarten children. In that study, bilingual children had lower English scores than monolingual children, and that main effect of bilingualism held across levels of SES.

Changes in Input Balance and Language Dominance

The fourth question asked of these data was whether, between 22 and 48 months, the balance of English and Spanish use in talk to children in these bilingual homes changed, and whether there were corresponding changes in the children's language dominance. The findings indicated that between 22 and 30 months, use of English in these children's bilingual homes was stable, but English use increased between the time the children were 30 months and the time they were 48 months old. A variety of factors likely contributed to the increased use of English. Some of these children began to attend childcare outside the home and some of these children had older siblings who entered school. Both these factors have been found in other studies to be associated with increased use of the community language at home by mothers who are native heritage language speakers (Bridges & Hoff, 2012; Prevoo et al., 2011). Also, anecdotally, some participating parents reported that they consciously increased their use of English to prepare their children for school.

The children also changed in the size of the gap between their Spanish and English skills. The children with one native Spanish- and one native English-speaking parent were more advanced in English at every time point, and increasingly so at every interval from 22 to 48 months. Those with two native Spanish-speaking parents had stronger Spanish than English skills from 22 to 30 months, but at 48 months, their English skills were stronger than their Spanish skills.

The Relation Between Home Language Use and Children's Language Development Over Time

The final question we asked of these data was whether the influence of the balance of English and Spanish use at home diminished as these children from bilingual homes became older. We asked this question separately for the children with one and two native Spanish-speaking parents. The findings indicated no systematic decrease in influence over time, but they did indicate a clear difference in the nature of influence between the two family types.

Among the children with one native Spanish-speaking and one native English-speaking parent, English use at home was a strong predictor of English vocabulary and a weak and nonsignificant negative predictor of Spanish vocabulary. In contrast, among the children with two native Spanish-speaking parents, English use in the home was a weak and nonsignificant predictor of English vocabulary and a strong negative predictor of Spanish vocabulary. Thus, it appears that when one parent is a native English speaker, English use in the home benefits the child's English while not taking away from Spanish development. In contrast, in homes with two native Spanish speakers, use of English takes away from the child's Spanish development while not benefitting English development. This pattern of findings was consistent across the age range studied, with the exception of an essentially zero correlation at 22 months between English exposure at home and English vocabulary for children with two native Spanish-speaking parents, which likely reflects a floor effect of the instrument among these children. It is likely also that the low levels of English-language vocabulary in the children with one native English-speaking parent, which were significantly different from those of the monolingual children in the trajectory analyses that made use of data from all four time points, had to do with the fact that the majority of the native English-speaking parents were fathers, who, in these households, spent less time with their children than the mothers. A previous study of the larger sample at 25 months found that within the homes with one native English-speaking parent and one native Spanish-speaking parent, the children with native English-speaking mothers had more advanced English skills than children with native English-speaking fathers (Place & Hoff, 2011).

The finding that English use at home was only a weak predictor of English skills in children from households in which both parents were native Spanish speakers echoes another finding in the literature: among Head Start children with native Spanish-speaking mothers, mothers' increased use of English over the three-year period of the study was not associated with better English scores by their children, but it was associated with worse Spanish scores (Hammer et al., 2009). Hammer et al. (2009) interpreted their finding as indicating that the children were receiving sufficient English exposure in school such that changes in English exposure at home had no discernible influence. However, approximately 60 percent of the children from bilingual homes in the present sample also attended English-language preschool or childcare an average of more than 25 hours per week. (The exact numbers are 9 out of 15 children with one Spanish-speaking parent and 7 out of 11 children with two Spanish-speaking parents attended English language programs for an average of 26.17 [$SD = 12.9$] and 28.94 [$SD = 14.8$] hours per week, respectively.) That exposure notwithstanding, when there was a native English speaker in the home, home use of English was a positive predictor of the children's English skills. Based on the present findings, we suggest that the lack of a relation of English at home to children's English language skills in Hammer et al. (2009) might also have reflected the English language skills of the sample, who included native Spanish speakers and native Spanish-English bilinguals but not native speakers of only English (C. Hammer, personal communication, 2013).

Other sources of evidence also suggest that English input provided by native English speakers is more useful for the acquisition of English than English input provided by nonnative speakers. In a sample of 25-month-olds, which included some of the children

from bilingual homes in the current sample, the portion of children's input that was provided by native English speakers was a unique predictor of the children's English vocabulary (Place & Hoff, 2011), and that finding was replicated in a separate sample of 30 month-olds (Place & Hoff, 2013). Two separate studies, one of 4- to 7-year-old immigrant children and a second of preschool children in immigrant families in English-speaking Canada, found no relation between children's English exposure at home and their English skills (Paradis, 2011; Paradis & Kirova, in press). Among the older children, in contrast, out-of-home contact with English speakers was a positive predictor of children's English skills (Paradis, 2011). Other evidence consistent with the idea that native input is more supportive of language development than nonnative input includes findings that the English proficiency of immigrant mothers predicts their children's English vocabulary both as children (Hammer et al., 2012) and as adults (Jia Aaronson, & Wu, 2002).

Limitations

The current study has limitations. The sample size is small, limiting the questions that can be asked of these data and the conclusions that can be drawn. In a larger sample, the weaker, nonsignificant relations between home language use and children's vocabulary would reach statistical significance. The relative amount of English spoken at home would be a positive predictor of English vocabulary in both bilingual groups. However, if the current pattern of findings also held in a larger sample, those findings would suggest differences in effect size such that English language use in homes with a native English-speaking parent benefits children's English skills more than it hurts their Spanish skills but that English language use in homes with two native Spanish-speaking parents hurts children's development of Spanish skills without an equal benefit to their English skills. (Power analysis indicates that if the observed correlations are indicative of the population correlations, a sample size of 73 would be sufficient to detect all of the correlations between home language exposure and child vocabulary with a power of .8 at $\alpha = .05$, except the correlation with English vocabulary at 22 months among children with two native Spanish-speaking parents.)

Small sample size also precluded a complete search for effects of other variables that have been implicated as influences on language experience and development in bilingual children. We did look for main effects of gender in the bilingual sample and found no hint of any. This may indicate differences between the high-SES, largely South American sample studied here and other immigrant groups that have produced findings of gender differences (Hammer et al., 2011; Portes & Hao, 2002). We did not, however, have the power to investigate whether there were different gender effects operating in each type of bilingual home. It is possible that the homes with two native Spanish-speaking parents, as potentially less acculturated and more traditional, would have shown a gender difference. We were not able to investigate the influence of children's English and Spanish exposure in early childhood care and education.

A second limiting factor is that we looked only at measures of expressive vocabulary—because the vocabulary measures available at the earlier time points were measures of expressive language. Expressive vocabulary is an important outcome to account for because it is related to reading success. Studies of expressive language alone may not provide a

complete picture of the complexity of language acquisition in bilingual children. There is evidence in other work on bilingual development that the development of receptive language skills follows a different time course and may have different antecedents than the development of expressive language skills (Kohnert & Bates, 2002; Ribot & Hoff, in press; Thordardottir, 2011). Many young adults who were raised in Spanish-English bilingual homes describe themselves as not able to speak Spanish but able to understand it. Some of the children who appear not to be developing as expressive bilinguals may be developing as passive bilinguals.

Finally, there are limitations that arise from the measurement instruments available, as there are for any study that aims to assess children's language skill over time, in different languages, and among children from culturally different environments (Hoff, 2013b; Hoff & Rumiche, 2012). It was not possible to use the same instrument to assess productive vocabulary in 22 month olds and in 48 month olds. We presented data from another study, in progress, in which 30-month-old children were administered the two instruments used here. We found a high correlation between the measures, supporting their use as indicators of the same underlying skill. Nonetheless, the nonequivalence of the measures meant that we could investigate changes over time only in relative skill. Of course, it is also not possible to use the same instrument to assess vocabulary in two different languages. The Spanish and English versions of the MacArthur inventories, which we used at 22, 25, and 30 months, were developed independently on the basis of research with monolingual groups. Although they have been validated against spontaneous speech measures with Spanish-English bilingual samples in the U.S. (Marchman & Martínez-Sussmann, 2002), it is still the case that they contain different items. The bilingual version of the EOWPVT, which we administered to the bilingual children at 48 months, was developed for Spanish-English bilingual children, and the monolingual version which we administered to the monolingual English speaking children at 48 months was developed for use with that population. To the extent that the test developers were successful in eliminating cultural bias in the version for bilingual children, the tests should be comparable. However, in modifying the monolingual version, the test developers eliminated some items, without replacing them with others. As a result there are fewer items in total on the bilingual version than the monolingual version in the range typically administered to children at 48 months. This may have depressed the bilingual children's scores, but it may not have, if elimination of those items allowed the bilingual children to advance farther in the test. It must be acknowledged that comparison of bilingual children's knowledge in their two languages and comparison of bilingual children's language knowledge to that of monolingual children has sources of error in addition to the error always entailed in measurement. The consequences of differences in the actual items between the Spanish and English MacArthur inventories and between the bilingual and monolingual versions of the EOWPVT is an important question for future research on the dual language skills of Spanish-English bilingual children.

Conclusions

Although many questions about the course of bilingual development and the social factors that influence it remain to be investigated, the present study adds to the extant literature several new findings: (1) Even under the presumably supportive circumstance of high family

SES and bilingual exposure from birth, children learning two languages may lag behind children learning only one in single language skills as they approach the age when formal schooling begins. However, language acquisition is not a zero-sum game. Some children who are exposed to two languages and learn two languages in the preschool years are on trajectories of gaining over their monolingual peers in the total language knowledge acquired. (2) The language trajectories of children from bilingual homes differ depending on whether one or both parents is a native speaker of the minority language. Children with only one native minority language parent have higher majority language skills but lower minority language skills—they are less bilingual, at least in terms of the expressive language skills measured here. (3) English language use in the home continues to be associated with children's English language skills at the age of four years, but more so when there is a native English speaker in the home.

These findings have implications for how public policy, educational practice, and parenting practices can address the twin concerns of preparing children from immigrant homes for schooling in the community language and also supporting their acquisition of the heritage language. The findings, consistent with findings from the study of bilingual preschool programs (Winsler et al., 1999), suggest that early bilingual exposure can have additive effects. That is, children can learn two languages simultaneously, and those who do so learn more than the children who learn only one. The present findings argue that language exposure at home is a significant and continuing source of influence on children's dual language development throughout the period from 22 to 48 months, but it is not just the relative quantity of exposure that matters. Something about the language exposure provided by native speakers appears to be more useful to language learning children than exposure provided by nonnative speakers. This finding, in turn, has two implications: (1) pressuring immigrant parents to speak to their children only in English, which educators sometimes do, may not have its intended consequences of preparing children for school and will have the consequences of diminishing their opportunities for heritage language development, and (2) children who do not have a source of native English input at home may profit in terms of English language development and successful bilingual development from out-of-home programs that provide access to native English speakers.

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Highlights

- The language trajectories of Spanish-English bilingual children differ depending on whether or not they have a native English-speaking parent
- Children with two native Spanish-speaking parents have better bilingual skills at 48 months than children with one native Spanish-speaking parent
- Children with two native Spanish-speaking parents have smaller English expressive vocabularies at 48 months than monolingual children
- Use of English in the home is a positive predictor of English vocabulary at 48 months only for children with a native English-speaking parent

Figure 1. Relative Total Vocabulary Trajectories for Children from Monolingual and Bilingual Homes

Relative Total Vocabulary trajectories from 22 to 48 months for children from monolingual English-speaking homes, children from Spanish-English bilingual homes with one native Spanish-speaking parent, and children from Spanish-English bilingual homes with two native Spanish-speaking parents

(a)

(b)

Figure 2. Relative English and Spanish Vocabulary Trajectories for Children from Bilingual Homes

Relative (a) English vocabulary and (b) Spanish vocabulary trajectories from 22 to 48 months for children from Spanish-English bilingual homes with one native Spanish-speaking parent, and children from Spanish-English bilingual homes with two native Spanish-speaking parents

Figure 3. Relative English Vocabulary Trajectories for Children from Monolingual and Bilingual Homes

Relative English vocabulary trajectories from 22 to 48 months for children from monolingual English-speaking homes, children from Spanish-English bilingual homes with one native Spanish-speaking parent, and children from Spanish-English bilingual homes with two native Spanish-speaking parents

Figure 4. English Vocabulary Percentile Scores at 48 Months for Children from Monolingual and Bilingual Homes

English vocabulary percentile scores at 48 months for children from English monolingual homes, children from Spanish-English bilingual homes with one native Spanish-speaking parent, and children from Spanish-English bilingual homes with two native Spanish-speaking parents

Figure 5. Raw English Vocabulary Scores for Children from Monolingual and Bilingual Homes and Raw Spanish Vocabulary Scores for Children from Bilingual Homes at 48 Months

Raw English vocabulary scores at 48 months for children from English monolingual homes, and raw English and Spanish vocabulary scores at 48 months for children from Spanish-English bilingual homes with one native Spanish-speaking parent, and children from Spanish-English bilingual homes with two native Spanish-speaking parents

Table 1

Mean Ages (and Standard Deviations) for Participants from Monolingual and Bilingual Homes at Each Assessment Point

Home Language Group	Assessment point			
	22 mos.	25 mos.	30 mos.	48 mos.
Monolingual (English) home	22.72 (.31)	25.80 (.30)	30.95 (.37)	49.97 (.70)
Bilingual home, 1 native Spanish-speaking and 1 native English-speaking parent	22.84 (.31)	25.73 (.31)	30.93 (.33)	50.03 (.72)
Bilingual home, 2 native Spanish-speaking parents	22.61 (.17)	25.86 (.33)	30.87 (.36)	50.35 (.77)

Table 2

Home Language Use Over Time: Mean Percent (and Standard Deviations) of Language Exposure at Home in English for Participants from Monolingual and Bilingual Homes at Each Assessment Point

Home Language Group	Assessment point		
	22 mos.	30 mos.	48 mos.
Monolingual (English) home	99.84 (.90)	99.48 (1.98)	99.84 (.90)
Bilingual home, 1 native Spanish-speaking and 1 native English-speaking parent	55.00 (26.12)	55.00 (29.82)	67.00 (23.59)
Bilingual home, 2 native Spanish-speaking parents	34.55 (31.58)	33.50 (34.48)	44.09 (38.33)

Table 3

Children's Language Balance Over Time: Mean Levels (and Standard Deviations) of English Expressive Vocabulary as a Percent of Total (English + Spanish) Vocabulary at 22, 25, 30, and 48 Months for Participants from Bilingual Homes

Home Language Group	Assessment point			
	22 mos.	25 mos.	30 mos.	48 mos.
Bilingual home, 1 native Spanish-speaking and 1 native English-speaking parent	.56 (.07)	.61 (.06)	.65 (.05)	.86 (.04)
Bilingual home, 2 native Spanish-speaking parents	.40 (.07)	.45 (.08)	.45 (.10)	.64 (.08)

Table 4

Correlations between Relative Amount of English Language Exposure at Home and Children’s English and Spanish Expressive Vocabulary Scores at 22, 30, and 48 Months for Children from Bilingual Homes by Home Language Group

Outcome measure	Home Language Group				
	1 native Spanish-speaking parent, 1 native English-speaking parent	2 native Spanish-speaking parents			
	22 mos.	30 mos.	48 mos.	22 mos.	30 mos. 48 mos.
English Vocabulary	.634 *	.772 *	.734 *	-.065	.578 .287
Spanish Vocabulary	-.353	-.550 +	-.298	-.555 +	-.694 + -.815 *

+ p<.10
* p< .05, two-tailed