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Profiles of Minority-Majority Language Proficiency in 5-Year-Olds

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Abstract

Children from language minority homes reach school age with variable dual language skills. Cluster analysis identified four bilingual profiles among 126 U.S.-born, 5-year-old Spanish–English bilinguals. The profiles differed on two dimensions: language balance and total language knowledge. Balance varied primarily as a function of indicators of the relative quantity and the quality of their language exposure (amount of home exposure and maternal education in each language). Total language knowledge varied primarily as a function of indicators of children's language learning ability (phonological memory and nonverbal intelligence). English dominance was more prevalent than balanced bilingualism; there was no Spanish dominant profile, despite average Spanish dominance in home language use. There was no evidence of a tradeoff between English and Spanish skills.

In the United States, more than 12 million children hear a minority language at home from birth (Kids Count Data Center, 2020). Over two-thirds of those hear English as well (Winsler et al., 2014), and they reach school age with varying levels of proficiency in two languages. Despite a burgeoning literature on bilingual development, the nature of the variability in the dual language skills of children in language minority homes has not been well described, nor are the factors that contribute to that variability well understood. One reason for this poor understanding of variability in bilingual children's dual language skills is that research has tended to treat bilingual children's development in each language as a separate outcome, rather than treating dual language skill as the single outcome of dual language exposure. This approach not only fails to adequately capture the nature of children's dual language skills, it also leaves unaddressed the question of how the acquisition of one language is related to the acquisition of another.

When differences among bilingual children in the nature of their dual language proficiency are described, the vocabulary for doing so is typically limited to *balance* and *dominance*. This vocabulary allows distinguishing those children who are stronger in one language (e.g., Spanish-dominant bilinguals) from those who are stronger in the other (e.g., English-

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dominant bilinguals) and from those who have nearly equivalent in their levels of proficiency in the two languages (i.e., balanced bilinguals). These descriptive labels are inadequate, however. They do not capture differences among bilingual children in their absolute levels of skill in two languages. A child entering school as a balanced bilingual who is strong in two languages is importantly different from a child entering school as a balanced bilingual who is weak in both languages. The vocabulary of dominance and balance as descriptors of differences among bilinguals is also potentially misleading because it implies that dual language skills vary on a single dimension with a necessary tradeoff between skill in one language and skill in another.

Because very little research has described bilingual children's constellations of dual language skills in terms other than balance and dominance, we do not know how often early dual language exposure results in strong balanced proficiency or how often early dual language exposure results in low levels of proficiency in two languages. This latter potential outcome is of concern to educators, clinicians, and parents, but the data are not available to indicate how big a concern it should be. Furthermore, without a description of the outcomes of dual language exposure, we cannot have a good idea of what factors support strong balanced bilingualism and what factors might put children at risk for weak skills in two languages. This study uses a person-oriented analytic approach to identify profiles of dual language proficiency among 5-year-old children raised in Spanish-speaking homes in the United States. We report the prevalence of those profiles, and we identify predictors of profile membership in child-internal and child-external factors that have been found in prior research to be sources of influence on early language growth.

Evidence Regarding the Relation Between Two Languages in Development

A description of individual differences in bilingual skill in terms of degrees of dominance or balance would be adequate if the only factor influencing language growth were the distribution of children's language experience between their two languages. If that were the case, children's skill levels in one language would be perfectly, and negatively, correlated with their skill levels in the other language. However, the evidence makes it clear that although the relative quantity of children's exposure to each language in a bilingual environment is a strong and reliable predictor of their skill levels in each language (Hoff, 2018; Thordardottir, 2014; Unsworth, 2016), it is not the only factor.

One kind of evidence that relative quantity of exposure is not the only influence on children's growth in two languages consists of findings that the correlation between bilingual children's skill levels in their two languages is neither perfect, nor consistently negative. Multiple studies of bilingual children, at ages ranging from 2 to 7 years, using different measures of language skill, find correlations between skill levels in their two languages ranging from weakly negative (e.g., Marchman, Fernald, & Hurtado, 2010) to moderately positive (e.g., Scheele, Leseman, & Mayo, 2010), with many studies finding near-zero correlations (Oller & Eilers, 2002). The second kind of evidence that relative quantity is not the sole influence are findings of effects of other factors—some external to the child and some internal. External influences include the absolute quantity of exposure (Marchman, Martínez, Hurtado, Grüter, & Fernald, 2017) and the quality of that exposure,

as evidenced in effects of the proportion of input provided by native speakers (Place & Hoff, 2011, 2016), the proficiency of nonnative sources of input (Buac, Gross, & Kaushanskaya, 2014), and maternal education (Hoff, Burridge, Ribot, & Giguere, 2018). Birth order has also been associated with differences in exposure to and acquisition of the heritage language in immigrant families (Bridges & Hoff, 2014; Lauro, Core, & Hoff, 2020). Internal influences include children's phonological memory abilities (Gathercole, 2006; Paradis, 2011; Parra, Hoff, & Core, 2011) and nonverbal intelligence (Blom, 2019; Collins, O'Connor, Suárez-Orozco, Nieto-Castañon, & Toppelberg, 2014; Hakuta, 1987). None of these external or internal influences imply a tradeoff between two languages in acquisition. The absolute quantity and the quality of exposure to each language can vary independently, and ability should affect the acquisition of two languages in the same way.

Theoretical Approaches to Understanding the Relation Between Two Languages in Development

Children's immediate experiences and their learning abilities do not exhaust the influences on bilingual development. The bioecological framework articulated by Bronfenbrenner and Morris (1998) and the related Specificity Principle applied to multiple language learning (Bornstein, 2013) point to conditions in the broader sociocultural environment as moderators of the outcome of dual language exposure. The attitudes speakers and learners hold toward both languages and the instrumental value of each language also influence bilingual development and, in particular, the relation between the acquisition of one language and the acquisition of another.

A particularly influential approach to the topic of environmental influences on bilingualism, which was initially articulated with respect to sequential bilingualism (i.e., the circumstance in which exposure to a second language begins after the acquisition of a first language is well underway), made a distinction between *additive* and *subtractive* environments (Lambert, 1975). *Additive* environments are those in which learning the second language adds to what the child already knows; the first language does not suffer. *Subtractive* environments are those in which the second language replaces the first. With respect to simultaneous bilingual development, the term *additive* has been used to describe the circumstance in which exposure to two languages results in learning more than does exposure to one language. The term *subtractive* is used to describe the circumstance in which the two languages compete and learning one takes away from the learning of the other (Cha & Goldenberg, 2015).

Where one of the two languages a child hears is a minority language and the other a majority language, additive home environments appear to be those that provide more exposure to the minority language than to the majority language. De Houwer (2007) found in a survey of nearly 2,000 language minority households in Belgium that included a child between 6 and 10 years old, that only those children from households where both parents spoke the minority language were likely to be bilingual. Otherwise, children were likely to be monolingual speakers of the majority language, Dutch. Similarly, Gathercole and Thomas

(2009) found that children in Wales who were exposed to Welsh and English at home reliably acquired English but not necessarily Welsh.

A related finding from a study of Spanish–English bilingual kindergarten children in the United States is that the correlation between the children's English and Spanish skills was positive, suggesting additive bilingualism, only among children who came from Spanish-dominant homes. Among the children from English–dominant homes, the correlation between their English and Spanish skills was negative, suggesting subtractive bilingualism. The correlation between English and Spanish skills was near zero for those children whose home language exposure was relatively balanced (Cha & Goldenberg, 2015).

In sum, the foregoing studies of influences on minority and majority language acquisition in young children suggest that majority language dominance is a more likely outcome than balanced bilingualism or minority language dominance among children exposed to both a minority and majority language from an early age. The findings also suggest that where balanced bilingualism is the outcome, it results from strong support for minority language development. Finally, if Cha and Goldenberg's (2015) description of minority language-dominant environments as an additive and majority language-dominant environments as subtractive is correct, then the children who are balanced bilinguals as a result of a minority language-dominant environment should also be more advanced in terms of their total language knowledge, combined across both languages. In contrast, the majority language-dominant children from majority language-dominant environments will have experienced subtractive bilingualism and their total language knowledge will be less as a result.

Previous Descriptions of Profiles of Bilingual Proficiency and Their Correlates

Individual children's bilingual skills can be described in terms of their position in a two-dimensional space defined either by their skill levels in each language or defined by the dimensions of balance and total language knowledge. However, describing the distribution of children in those two-dimensional spaces and the factors that influence that distribution requires a different approach.

One approach, taken by Collins et al. (2014) characterized the distribution of Spanish–English bilingual kindergarten children from low-socioeconomic status (SES) Spanish-speaking families in the United States by defining four profiles a priori, with respect to standard scores on monolingual-normed tests. They found that children were not equally distributed among profiles. At kindergarten (M_{age} = 6 years), the majority of children had low levels of proficiency in both languages, relative to those monolingual norms; only 5% were proficient in both languages; roughly equal proportions were proficient only in Spanish or only in English. Children with low skills in both languages differed from children with other skill profiles in having mothers with lower levels of education and in having lower nonverbal IQs. Children who were proficient in only one language had either more exposure to that language or their primary source of exposure was more proficient in that language.

The only other study, to our knowledge, to characterize individual differences among bilingual children in terms of their constellations or profiles of skill in two languages, defined the profiles, also a priori, but with reference to the means in the study sample. Dixon, Wu, and Daraghmeh (2012) measured the English and ethnic language (Chinese, Malay, or Tamil) skills of kindergarten children in Singapore. Children could be above the sample mean in both languages, below the sample mean in both languages, or above in one and below in the other. Because profiles were defined with reference to the sample mean—and scores were normally distributed, there were equal numbers of children in each of the four profiles. Family SES was a significant predictor of profile membership, with children from low SES families overrepresented among children with low skills in both languages. Children from middle and high SES families were likely to have stronger skills in English than in their ethnic language; children with high levels of proficiency in two languages came from all SES backgrounds.

In sum, the two studies in the literature that have described profiles of dual language skill among bilingual children find variability in balance and also on a dimension of total language knowledge, with some children relatively strong in both languages and others relatively weak in both languages. The determinants of profile membership suggested by these findings include the balance of language exposure at home and the proficiency of sources of exposure as predictors of dominance, and SES or maternal education and nonverbal intelligence as predictors of total language knowledge.

These previous approaches have limitations, however. Where profiles are defined a priori with respect to the sample mean in each language, as in Dixon et al. (2012), both the profiles and their prevalence are predetermined, not discovered. Furthermore, the search for predictors of profile membership is potentially hampered by individuals whose skills place them at profile borders. Such individuals create heterogeneity within profiles, and they minimize the differences between profiles. Where profiles are defined a priori in terms of monolingual norms, as in Collins et al. (2014), the profiles are also predetermined. Prevalence is meaningful, but in the case of the Collins et al. (2014) study, it is prevalent within a low SES sample, limiting the generalizability of their findings.

This study takes a different approach to identify profiles of dual language skills in bilingual children. Rather than defining profiles a priori, we use cluster analysis to identify groups of children with similar patterns of English and Spanish expressive vocabulary skills. The goal in using this person-oriented statistical approach is to describe differences among individuals in how English and Spanish skills are related to each other (Laursen & Hoff, 2006). Cluster analysis identifies groups within the sample that maximize similarity within each group and maximize the difference between the groups in terms of the variables that define the clusters. Because these groups emerge from the data, the size of each group in the sample is an indicator of the prevalence of that skill profile in the population. The minimized differences within groups and maximized differences between groups help in the search for characteristics of children and their language environments that predict individual children's profile membership.

The Present Study

This study addresses three research questions with data on the expressive vocabularies in English and in Spanish of 126 U.S.-born 5-year-old children from Spanish-speaking homes: (a) What patterns of dual language proficiency are seen in 5-year-old children who have been exposed to a majority and minority language from infancy?, (b) What is the relative prevalence of those patterns?, and (c) What characteristics of children's language learning abilities and language exposure are associated with the different patterns of dual language proficiency that we see? The abilities and exposure features we investigate as potential predictors of profile membership are those that have been found to be related to the growth of either English, Spanish, or both in this and other samples of bilingually developing children (Hoff, Burridge, et al., 2018; Lauro et al., 2020; Place & Hoff, 2011, 2016). Those predictors include the child-internal factors of phonological memory skill and nonverbal intelligence and the child-external factors of the relative quantity of language exposure, maternal education, child birth order, and parents' language backgrounds.

Method

Participants

The participants were 126 children from Spanish-speaking homes (61 girls, 65 boys) who are participants in an ongoing longitudinal study of dual language development which began when the children were 2.5 years old (Hoff & Ribot, 2017; Lauro et al., 2020). The data for the present analyses were collected at the 5-year assessment ($M_{\mathbf{age}}$ = 5.04 years, SD = 0.05), with the exception of the assessment of phonological memory, which occurred at study entry, at 2.5 years. The inclusion criteria were that at least one parent was born in a Spanish-speaking country and that Spanish was spoken in the home, either exclusively or in combination with English; Spanish had to be spoken at least 10% of the time and no third language could be spoken more than 5% of the time. The foreign-born parents came from 15 different countries in Latin America and the Caribbean and from Spain. The most frequently represented countries of origin were Columbia, Peru, Venezuela, and Cuba (details are available in Lauro et al., 2020). The children were Hispanic White (93.7%), Hispanic African (2.4%), European American (2.4%), or another other ethnicity (1.6%). Parents reported that all children were full term and healthy at birth, with normal hearing based on otoacoustic emissions tests performed in the hospital. At study entry, all children were screened for communicative delay using the *Ages and Stages Questionnaire* (Squires, Potter, & Bricker, 1999). Participants were recruited through advertisements in local magazines, programs for parents with young children, and word of mouth. Data were collected in South Florida between 2010 and 2015.

Procedure

Background interviews were conducted with each child's primary caregiver by a fully bilingual examiner. Standardized tests of English and Spanish vocabulary were administered individually to each child. English and Spanish were assessed on separate days in counterbalanced order. Data collection occurred in the participants' homes or a university

lab space, depending on the participants' preference. Approximately 85% of the visits were in the participants' homes.

Measures and Instruments

Table 1 lists the measures and presents descriptive statistics for the whole sample. The instruments for assessing each measure are described below.

Expressive Vocabulary—Children's English and Spanish expressive vocabularies were assessed using the *Expressive One-Word Picture Vocabulary Test-Spanish Bilingual Edition* (*EOWPVT*; Brownell, 2001). Internal consistency, as reported in the test manual, ranged from $\alpha = .92$ to .97, depending on age, with a test–retest correlation of $r = .91$ (Brownell, 2001). The standard administration procedure for the Spanish–English bilingual version is to allow the child to provide a label in either language. We modified this procedure to allow only English labels during the English assessment, and only Spanish labels during the Spanish assessment in order to obtain measures of the children's expressive vocabulary skills in each language. This is a procedure that has been used by other researchers (Anthony et al., 2009), but because this is not the standard administration procedure, the test does not have norms for separate English and Spanish scores. Therefore, we use raw scores in all analyses.

Phonological Memory—Phonological memory skill was measured at 2.5 years in a nonword repetition task. Phonological memory is a well-established predictor of language growth in typical and atypical populations (Gathercole, 2006). It is heritable (Bishop, 2002), and studies of older children find substantial longitudinal stability in phonological memory skills (Conti-Ramsden & Durkin, 2007; Wagner et al., 1997). Previous research on the current sample found that phonological memory assessed at 2.5 years predicted English and Spanish growth curves from 2.5 to 5 years. For purposes of the larger study from which these data are drawn, there were separate assessments of phono-logical memory for Spanish-sounding and English-sounding nonwords. In this study, we used whichever score was higher as the best measure of the child's phonological memory abilities. The stimuli are fully described in Lauro et al. (2020).

The phonological memory tasks were administered by native speakers of each language. After a brief warm-up period, the examiner showed the child a small toy animal or person-like figure and said, for example, "Look, this is *Challoon*. Can you say *Challoon*?" Examiners presented items no more than three times before moving on to the next item. Children's responses were audio and video recorded, transcribed, and scored for accuracy using the double-blind transcription procedure in Phon, a software program for the transcription, annotation, and analysis of phonological and phonetic data (https://www.phon.ca; Rose & MacWhinney, 2014). Further details on the design of the stimuli and scoring of repetition accuracy are available in Lauro et al., 2020.

Repetition accuracy was measured as the percent of consonants correctly repeated (PCC) based on the double-blind transcriptions and using the PCC function available within Phon 2.2 (https://www.phon.ca; Rose & MacWhinney, 2014).

Nonverbal Intelligence—Nonverbal IQ was measured using the *Primary Test of Nonverbal Intelligence* (Ehrler & McGhee, 2008). Instructions were given in whichever language the child appeared to prefer, and the test itself is entirely nonverbal. Standard scores were calculated based on published norms, with a mean of 100 (*SD* = 15).

Relative Quantity of Language Exposure—In the context of an extensive interview also conducted at a child age 5 years, the children's primary caregivers provided estimates of the relative amount of the target child's home language exposure that was in English and in Spanish. The interview included questions about who lived in the household and what languages they spoke to the child. The measure of the relative quantity of language exposure was the caregiver's response to the question, "What percent of the time are English and Spanish spoken to (target child) in the home?" We know from other analyses of data collected on these children at 6-month intervals from 2.5 to 5 years that individual differences in home language use were stable over time; all bivariate correlations between estimates provided at different ages had an *r* value > .70. Thus, the single concurrent measure of exposure should capture individual differences in children's cumulative home exposure from the age of 2.5. Mean levels of English exposure rose from 34% at 2.5 years to 42% at 5 years. The measures of English and Spanish exposure are reciprocal, with the exception of measures for one child whose caregiver reported a third language was used at home 5% of the time. Given the reciprocal nature of the measures of English and Spanish exposure, we used the estimate of the relative amount of English exposure as our indicator of the balance of Spanish–English exposure at home.

Maternal Educational Attainment—Previous analyses of a subsample of the larger study from which the present data were drawn found language-specific effects of maternal education (Hoff, Burridge, et al., 2018). This finding is consistent with other findings that educational attainment in each language is a predictor of the heritage and majority language proficiency of immigrant bilinguals (Ardila, Rosselli, Ortega, Lang, & Torres, 2019; Giguere & Hoff, 2020) and that second language proficiency among immigrant parents is related to properties of their child-directed speech (Hoff, Core, & Shanks, 2020). Therefore, we used separate measures of maternal education attained in English and in Spanish. To illustrate, a mother who completed high school in Peru before emigrating and subsequently earned a master's degree in the United States would have different levels of education in the two languages. Levels of education were coded on a 0–5 scale where 0 = *no schooling*, 1 = *less than high school*, 2 = *high school degree*, 3 = *2-year degree or equivalent*, 4 = *4-year degree or equivalent*, 5 = *advanced degree*. This differs from the coding of education in a previous analysis of this sample (Lauro et al., 2020), in which distinctions were made only between *no schooling*, *less than a college degree*, and *college degree or higher*, and college degree was defined to include a 2-year degree.

Child Birth Order—Birth order was based on primary caregiver report and coded dichotomously as either *first born/only child* or *later born*.

Family Type-Parent Language Histories—Children's families were categorized with respect to the parents' history of exposure to English and Spanish. Previous research has

made the distinction between native and nonnative speakers as sources of language exposure (e.g., Place & Hoff, 2011, 2016). Here we elaborate that distinction using the age at which those parents who were foreign-born native Spanish speakers immigrated to the United States as an indicator of their dual language proficiency on the logic that a native Spanish speaker who immigrated to the United States as a young child is likely to have different levels of Spanish and English proficiency than a native Spanish speaker who immigrated as young adult, even though both would be considered to be bilingual. Each parent was classified as a *native Spanish speaker, late learner of English* (age of immigration > 8 years), a *native Spanish speaker, early learner of English* (age of immigration ≤ 8 years), or a *native English or early learner of English with a native language other than Spanish*. This latter category included 9 mothers and 1 father who were U.S.-born native English–Spanish bilinguals, and 2 mothers and 3 fathers who were foreign-born native speakers of a language other than English but who used only English at home.

The children were grouped into three categories based on their parents' language histories: (a) *both parents were native Spanish speakers and late learners of English*, (b) *one parent was a native Spanish speaker and late learner of English, the other parent was a native speaker or early learner of English*, and (c) *both parents were native speakers or early learners of English*, although every child had at least one parent who was born in a Spanish-speaking country and was a native Spanish speaker.

Results

Descriptive Statistics and Preliminary Analyses

Preliminary examination of the data indicated that the distributions of English and Spanish expressive vocabulary scores were skewed. Therefore, raw scores were Winsorized to reduce effects of extreme outliers by converting values that were three standard deviations above the mean to the highest score within three standard deviations of the mean. This involved changing one English score value and two Spanish score values. In this latter case, the higher outlier was converted to the highest score within three standard deviations of the mean, plus 1 (Salkind, 2010). The means presented in Table 1 include the Winsorized scores.

Preliminary analysis of the relation between English and Spanish scores yielded the finding that, in this sample, English and Spanish skills were independent, $r(N = 126) = -.011$. The central analyses of this study were then aimed at identifying profiles of dual language skills in these children, describing their prevalence, and identifying factors associated with profile membership.

Identification of Profiles of Dual Language Skill

The search for patterns of dual language proficiency was accomplished using cluster analysis to identify subgroups of participants who were maximally similar within groups and maximally different between groups with respect to their English and Spanish vocabulary scores. First, the data were submitted to hierarchical cluster analysis using Ward's method, which successively links pairs of cases together into clusters and then

links clusters into larger clusters, at each step minimizing the variance within clusters. The resultant dendogram was visually inspected, and the four-cluster solution was selected as making the most fine-grained distinctions that still yielded categories of sufficient size to support statistical comparison of the categories with respect to the hypothesized predictors of category membership. Then, a *K*-means cluster analysis was completed specifying a four-cluster solution. All analyses were conducted using Statistical Package for the Social Science (SPSS) Statistics, Version 26.0, software (International Business Machines Corporation, 2018). The four clusters identified by this procedure are indicated on the scatterplot in Figure 1. The mean English and Spanish vocabulary scores for children in each profile, along with the prevalence of each profile, are plotted in Figure 2, where the four profiles are ordered from lowest to highest with respect to the sum of the mean English and Spanish score.

Profile Descriptions

In the four profiles identified by the cluster analysis procedure, one profile (Profile 1) had significantly lower total vocabulary scores than all the others, two profiles (Profiles 2 and 3) had intermediate total vocabulary scores, and one profile (Profile 4) had significantly higher total vocabulary scores than all other profiles. In all profiles, the mean English score was significantly higher than the mean Spanish score (all ps < .03, two-tailed), but they differed in the degree of English dominance. Descriptively, Profile 1, with the lowest total score, was strongly English dominant. Profile 2 was more nearly balanced. Profile 3 was the most strongly English dominant. Profile 4 was the most nearly balanced profile. Profile 4 was also the profile in which children had, on average, the highest Spanish vocabulary scores while also having English scores that were not different from those of Profile 3, and it is the profile with an average total vocabulary score that was significantly higher than the total score for any other profile.

Profile Prevalence

These dual language profiles differed in prevalence. The most prevalent profile (Profile 3) was the most English-dominant profile, accounting for 36.5% of the sample. The next-most prevalent profile (Profile 1) was also English-dominant and accounted for 27% of the sample. The third most prevalent profile (Profile 2) was English-dominant but nearly balanced, with similar English scores to Profile 1 but stronger Spanish scores. This profile accounted for 30.7% of the sample. The least prevalent profile (Profile 4), while also English-dominant, had a significantly higher mean Spanish score than the other profiles and a mean English score not different from that of the most English-dominant profile (Profile 3); it accounted for 11.9% of the sample.

Characteristics Correlated With Profile Membership

Tables 2 and 3 present, for each of the dual language profiles, the descriptive statistics for the English, Spanish, and a combined, total vocabulary score (calculated by summing the English and Spanish raw scores) and for the measured child-internal and child-external hypothesized correlates of dual language proficiency, along with the results of analyses of variance or chi-square analyses that tested for differences among profiles in those characteristics. The results of post hoc paired comparisons between profiles, accomplished

with Tukey's honestly significant different (HSD) post hoc tests or Gardner pairwise post hoc tests (MacDonald & Gardner, 2000), are also indicated.

These profiles of dual language proficiency were associated with different child-internal and child-external factors. The two profiles with the highest total vocabulary scores (Profiles 3 and 4) differed from the two profiles with lower total vocabulary scores only in terms of child-internal factors. The higher total score profiles were associated with higher phonological memory scores (with some overlap between Profiles 2 and 3) and higher non-verbal IQ scores than the two profiles with lower total vocabulary scores (the measures of phonological memory and nonverbal IQ were significantly correlated, but they were not redundant, $r\,(n = 123) = .221$, $p = .014$). The two higher total profiles did not consistently differ from the two lower profiles in terms of any of the child-external factors. The two nearly balanced profiles (Profiles 2 and 4) differed from the two English-dominant profiles in exposure and maternal education. The children in the more balanced profiles experienced greater relative Spanish exposure and had mothers with higher levels of maternal education in Spanish than the strongly English-dominant profiles (Profiles 1 and 3). The two nearly balanced profiles (Profiles 2 and 4) did not differ from the two strongly English-dominant profiles (Profiles 1 and 3) in child-internal characteristics.

If we ask what factors distinguish the profile with the highest total score (Profile 4) from all other profiles, we find that it is high levels of Spanish exposure, high levels of maternal educational attainment in Spanish, and high child ability. (This profile was nearly balanced). If we ask what factors distinguish the profile with the lowest total score from all other profiles, we find it is relatively high levels of English use and low levels of maternal educational attainment in English. (This profile was strongly English dominant.) There was no profile characterized by similar and low scores in both English and Spanish. If we look at the two middle profiles in terms of total vocabulary and ask what distinguishes the more English-dominant profile from the more nearly balanced profile, where total vocabulary score does not differ, we find the English-dominant profile is associated with a higher relative quantity of English exposure, higher level of maternal education in English, higher frequency of one parent who is a native English speaker or early learner of English, and higher nonverbal IQ–all child-external factors pushing toward English, plus high nonverbal intelligence.

Discussion

The profiles of dual language proficiency among 5-year-old Spanish-English bilinguals that were identified in this study provide a description of the variation in the bilingual skills of a particular population of children who constitute a large portion of children entering school in the United States. These are U.S.-born children with one or two immigrant parents who have been exposed to Spanish since birth and who have also heard English at home in varying amounts, either from birth or soon there-after.

Patterns of Dual Language Proficiency at Age 5 Years

The nature of the profiles and their prevalence indicate that children from this sort of environment are likely to be English dominant by the time they are 5 years old. In fact, some

have very limited Spanish skills. There was no Spanish-dominant profile and there was no profile in which children had similar, low levels of skill in two languages.

The English dominance of these profiles, despite the average Spanish dominance of the children's home environments, is consistent with the results of other studies of minority-majority language bilingual children. Studies of Spanish–English bilingual children with approximately balanced dual language exposure from birth have found that from as early as 22 months of age, the children's English skill grows more rapidly than their Spanish skill (Hoff & Ribot, 2017; Hoff et al., 2012). As a result, there is average movement in dual language proficiency from initial balance to English dominance across the preschool period (Hoff, Rumiche, Burridge, Ribot, & Welsh, 2014). In the sample studied by Collins et al. (2014), at Kindergarten age (about 6 years, when tested), the children's home language exposure was, on average, balanced whereas more children were "proficient" in English than were "proficient" in Spanish, relative to monolingual norms. This finding is not limited to studies using standardized tests to measure proficiency. Using word types per minute in spontaneous speech as their measure of children's vocabulary, Escobar and Tamis-LeMonda (2017) found that children who were, on average, balanced Spanish–English bilinguals at 2 years were, on average, English dominant at 5 years. In that study, there were individual differences in changes over time and not all children became English-dominant, but no children started out English dominant at 2 years and became Spanish-dominant at 5 years. The present finding that strong English dominance is the most prevalent profile of bilingual skill is also consistent with international data to the effect that majority language acquisition is secure whereas minority language acquisition is vulnerable (De Houwer, 2007; Gathercole & Thomas, 2009).

Correlates of Dual Language Proficiency Profiles

Characteristics That Are Correlated With Nearly Balanced Bilingualism at 5 Years—

Children with the strongest bilingual profile (Profile 4), characterized by nearly balanced and strong English and Spanish skills relative to the rest of sample, experienced strong Spanish dominance in home language use and had mothers with relatively high levels of education attained in Spanish. In addition, the children had high phonological memory and nonverbal IQ scores. In short, the home environment provided a great deal of high-quality Spanish exposure, and the children had strong language learning abilities. The children in the other profile that was nearly balanced, but lower in both English and Spanish (Profile 2), also had high levels of Spanish exposure at home and mothers with high levels of educational attainment in Spanish, but the children had lower phonological memory and nonverbal IQ scores. The stronger balanced profile (Profile 4) was less prevalent than the balanced profile with moderate total vocabulary scores. Given that ability tends to be normally distributed in the population, it is not surprising that the group with the highest total score comes from the tail of the ability distribution and that this profile is less prevalent than profiles associated with mid-range abilities. The finding that there is no profile characterized by low scores in both languages suggests that children at the lower end of the distribution in ability were excluded from the sample on the basis of the screening at 2.5 years. In sum, it appears that home environments that provide a high quantity and quality

of Spanish exposure lead to fairly balanced Spanish–English bilingualism in the children, with internal ability factors influencing the level of both English and Spanish skill.

Characteristics That Are Correlated With English-Dominant Bilingualism at 5 Years—Just as there were two nearly balanced profiles, one higher than the other in total vocabulary score, there were also two English-dominant profiles, one higher than the other in total vocabulary score—although in this case it was only the English scores that contributed to the between-group difference in total vocabulary scores. The children in these two profiles differed from the children in the two balanced profiles in hearing relatively more English at home—although neither group experienced strongly English-dominant home exposure. The differences between these two groups of children with English-dominant skills are that the children in the profile with a higher mean total vocabulary score (Profile 3) differed from the children in the profile with the lower mean total vocabulary score (Profile 1) in having a higher level of English exposure and higher scores on both ability measures.

A final instructive comparison was between the two profiles with moderate and not significantly different total scores, but with different degrees of English dominance (Profile 2 and Profile 3). The more English-dominant group had more English exposure, had mothers who were more educated in English, and more frequently had a native English-speaking parent, suggesting that these children experienced not only high-quantity but also high-quality English exposure. The children in the more English-dominant group also had higher nonverbal IQ scores than the children with the less English-dominant profile. In previous analyses of English and Spanish vocabulary growth from 2.5 to 5 years in this sample, we found that nonverbal intelligence predicted only English, not Spanish growth (Lauro et al., 2020). Other studies have also found a relation between general intelligence and acquisition of the majority language, but not the minority language, in minority-majority bilingual children (Blom, 2019; Hakuta, 1987). We offered the hypothesis that majority language acquisition takes place out of the home more than minority language acquisition. It is, therefore, less supported by the scaffolding and maternal contingency that supports home language acquisition and is, therefore, a cognitively more demanding task.

Is Majority-Minority Language Bilingualism Additive or Subtractive?

The present findings are consistent with Cha and Goldenberg's (2015) argument that to the degree that environments support the acquisition of Spanish, Spanish–English bilingualism is additive. Across the entire sample, children's home exposure was slightly Spanish dominant (English exposure = 41.9%), and across the entire sample, there was no evidence of a tradeoff between Spanish and English language growth. The correlation between children's English and Spanish vocabulary scores was near zero. Two other analyses similarly support the conclusion that acquisition of Spanish does not subtract from the acquisition of English are: (a) a comparison of Profile 1 to Profile 2, and (b) a comparison of Profile 3 to Profile 4. In both these comparisons, there is no difference between the profiles in mean English vocabulary score, there is only a difference in mean Spanish score with higher total vocabulary scores associated with a higher Spanish vocabulary score. Spanish adds to the total without subtracting from English.

Why does a Spanish-dominant home environment result in additive bilingualism? How is it possible that greater relative use of Spanish in the home increases children's acquisition of Spanish without taking away from their acquisition of English, given the clear evidence that relative quantity of language exposure predicts the rate of growth in each of the languages a bilingual child is acquiring (Thordardottir, 2014; Unsworth, 2016)? One suggested answer invokes, at least implicitly, the notion of thresholds. In explaining their finding that Spanish-speaking mothers' use of Spanish at home predicted their children's Spanish skills but their use of English at home was unrelated to their children's English skills, Hammer et al. argued that the children, who were all attending Head Start programs, experienced sufficient exposure to English outside the home such that differences in the amount of exposure inside the home had no effect on their English language growth (Hammer, Davison, Lawrence, & Miccio, 2009).

Other evidence suggests that rather than a threshold after which additional exposure has no effect, that there is a gradual diminishment of returns from exposure, with increments above 60% exposure making less of a difference to acquisition than increments below that threshold (Thordardottir, 2014). This may arise from maturational constraints or cognitive constraints on the rate at which children can acquire language (Thordardottir, 2014). Such a nonlinear function relating exposure to acquisition would explain how relative exposure can predict language growth in each of a bilingually developing child's languages, yet children can learn two languages in less than twice the time it takes monolingual children to learn one. Neither absolute thresholds nor gradually diminishing returns from exposure explain the asymmetry in the effects of Spanish-dominant and English-dominant exposure, however.

One proposal that does address that asymmetry invokes proficiency in the sources of exposure as a factor. That is, to the degree that children's sources of English and Spanish are native Spanish speakers who are late learners of English, the tradeoff between English exposure and Spanish exposure in the home is not an equal trade. When children hear nonnative English in place of native Spanish, the benefit to their English growth is less than the detriment to their Spanish growth. Support for this argument comes from findings that the correlation between English exposure at home and English proficiency among 4-year-old Spanish–English bilinguals is higher among children with one native English-speaking parent than it is among children with no native English-speaking parent (Hoff et al., 2014). This argument is also consistent with findings that immigrant parents' proficiency in English is related to properties of their child-directed speech in English (Hoff et al., 2020) and to their children's English proficiency (Buac et al., 2014; Hammer et al., 2012). Finally, proficiency may be part of the reason that maternal use of English at home was unrelated to children's English growth and negatively predicted children's Spanish growth in Hammer et al. (2012).

A third potential part of the answer is that children's own use, in addition to their exposure, is a predictor—particularly of expressive language skills (Bohman, Bedore, Peña, Mendez-Perez, & Gillam, 2010; Ribot & Hoff, 2014; Ribot, Hoff, & Burridge, 2017). To the degree that Spanish–English bilingual children tend to speak in English even when they are addressed in Spanish, increases in Spanish exposure are not accompanied by increases in Spanish use, thus diminishing the benefit of Spanish exposure.

An asymmetry may also arise from spiraling influences of proficiency on exposure and acquisition. As children's English proficiency grows, they use English more and thus, they hear English more (Pearson, 2007). As their English proficiency grows, children also become increasingly able to use English exposure to build new language knowledge through processes of syntactic and semantic bootstrapping (Hoff, 2015). Finally, the asymmetry between English and Spanish in bilingual children's language growth reflects and is maintained by a larger English-dominant environment in the United States There may be consequences for family relationships and ethnic identity of not acquiring Spanish (Oh & Fuligni, 2010), but not acquiring English is not an option for children living in the United States. Consistent with this argument, we found, in data drawn from the same larger, longitudinal study as the present data, that across the period from 30 to 48 months, children's English skill was a negative predictor of subsequent growth in Spanish, whereas children's Spanish skill was unrelated to their subsequent growth in English (Hoff, Quinn, & Giguere, 2018).

Limitations

This study has limitations. The use of only one measure of language skill, a measure of expressive vocabulary, limits the descriptive value of the profiles that were identified. Vocabulary is an important measure of language skill and it is correlated with skill in other domains, but it is still only one domain. Also, this single measure is a measure of expressive language, and there is evidence that many bilingual children have stronger receptive than expressive skills—particularly in the minority language (Gibson, Oller, Jarmulowicz, & Ethington, 2012; Ribot & Hoff, 2014).

The present findings do not describe the language skills of children who hear very little of the majority language prior to school entry and who are essentially monolingual minority language speakers when they begin formal schooling. However, the data from the nationally representative Early Childhood Longitudinal Study, Birth Cohort indicate that in the United States 71% of children who hear a language other than English at home also hear English at home (Winsler et al., 2014), and English is ubiquitous in children's out-of-home experience, even in minority communities (Welsh & Hoff, 2020). Furthermore, data on children in the United States who are more Spanish dominant at school entry than the current sample suggest that they too move toward English dominance once school begins (Collins et al., 2014).

The particular languages and locale of this study also limit the generalizability of these findings. The typological distance between the two languages bilingual children acquire has been found to affect their language skills (Floccia et al., 2018). Spanish–English bilingualism may be easier than bilingualism in two less-similar languages. The relative prestige of the two languages a bilingual child acquires has also been argued to affect bilingual development (Smithson, Paradis, & Nicoladis, 2014). The minority language may be less vulnerable where it has more prestige. Finally, English may have a unique status; it is not only the majority language in the country where the children in this study lived, it is also a global language. Children are exposed to English through television, music, and video games. Because of its global status, English acquisition may be more guaranteed for children

in the United States than, for example, the acquisition of Icelandic is guaranteed to bilingual children in Iceland (Hilmarsson-Dunn & Kristinsson, 2010).

Conclusions and Implications

This study is the only study, to our knowledge, to describe the outcome of early dual language exposure in terms of bilingual skill profiles that reflect the relations in the data between children's skill levels in their two languages. We find that U.S.-born children who live in Spanish-speaking homes and who are also exposed to English from infancy tend to become English dominant by the age of 5 years—but some more so than others. Of the four profiles that emerged from a cluster analysis of the relation between children's English and Spanish expressive vocabulary scores, two profiles were strongly English dominant and included 63% of the sample; two were more nearly balanced and included 37% of the sample. Children in the more nearly balanced profiles were exposed to more Spanish at home and were more likely to have mothers with college degrees earned in Spanish than children in the strongly English-dominant profiles. The four profiles also differed in children's total, English + Spanish, vocabulary score. Children in the higher total score profiles differed from children in the lower profiles on measures of nonverbal IQ and phonological memory. A final result was that in these profiles there is no evidence of a tradeoff between the acquisition of English and the acquisition of Spanish. Rather Spanish added, in varying amounts, to English skill, which was more uniformly acquired.

The findings of this study have implications for parents, educators, clinicians, and policy makers whose concerns include the language development of children from language minority homes. The profiles of dual language proficiency and the associated child characteristics that were identified among the Spanish–English bilingual 5-year-olds in the present study suggest the following:

1. Dominance is not the same thing as proficiency. Bilinguals differ both in dominance and in total language knowledge. Teachers and clinicians cannot infer a bilingual child's language proficiency from that child's language dominance. There are balanced bilinguals at the age of 5 years who have stronger English skills than some English-dominant bilinguals.
2. Individual differences in dominance are significantly related to home exposure, although the function that relates exposure to dominance is biased toward English. Balanced language exposure at home does not result in balanced proficiency; Spanish-dominant home exposure appears to be necessary.
3. Individual differences in total language knowledge are significantly related to indicators of language-learning ability, measured here in terms of phonological memory and nonverbal intelligence. This should not be surprising. Monolingual children of the same age vary in their total language knowledge, and the ability measures that predict total vocabulary scores in this study have also been found to account for individual differences in language skill in monolingual children.
4. Weak skills in both languages is not an outcome of dual language exposure found among typically developing children in supportive environments. Bilingual

children who have weak skills in both languages at the age of 5 years may have an underlying impairment or inadequate environmental support for language acquisition.

5. Minority language exposure does not threaten the acquisition of English by children in the United States. There is no tradeoff between English and Spanish. Rather children reliably acquire English, and their total language knowledge is greater to the degree that they also acquire Spanish.

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References

Anthony JL, Solari EJ, Williams JM, Schoger KD, Zhang Z, Branum-Martin L, & Francis DJ (2009). Development of bilingual phonological awareness in Spanish-speaking English language learners: The roles of vocabulary, letter knowledge, and prior phonological awareness. Scientific Studies of Reading, 13, 535–564. 10.1080/10888430903034770

Ardila A, Rosselli M, Ortega A, Lang M, & Torres VL (2019). Oral and written language abilities in young Spanish/English bilinguals. International Journal of Bilingualism, 23, 296–312. 10.1177/1367006917720089

Bishop DV (2002). The role of genes in the etiology of specific language impairment. Journal of Communication Disorders, 35, 311–328. 10.1016/s0021-9924(02)00087-4 [PubMed: 12160351]

Blom E (2019). Domain-general cognitive ability predicts bilingual children's receptive vocabulary in the majority language. Language Learning, 69, 292–322. 10.1111/lang.12333

Bohman TM, Bedore LM, Peña ED, Mendez-Perez A, & Gillam RB (2010). What you hear and what you say: Language performance in Spanish-English bilinguals. International Journal of Bilingual Education and Bilingualism, 13, 325–344. 10.1080/13670050903342019 [PubMed: 21731899]

Bornstein MH (2013). The specificity principle in multiple language learning. SRCD Social Policy Report, 27, No. 4, 5.

Bridges K, & Hoff E (2014). Older sibling influences on the language environment and language development of toddlers in bilingual homes. Journal of Applied Psycholinguistics, 35, 225–241. 10.1017/S0142716412000379 [PubMed: 25346557]

Bronfenbrenner U, & Morris PA (1998). The ecology of developmental processes. In Damon W(Series Ed. & Vol. Ed.), Handbook of child psychology: Vol. 1. Theoretical models of human development (5th ed., pp. 993–1028). Hoboken, NJ: Wiley.

Brownell R (2001). Expressive One-Word Picture Vocabulary Test: Spanish bilingual edition manual. Novato, CA: Academic Therapy.

Buac M, Gross M, & Kaushanskaya M (2014). The role of primary caregiver vocabulary knowledge in the development of bilingual children's vocabulary skills. Journal of Speech, Language, and Hearing Research, 57, 1804–1816. 10.1044/2014_JSLHR-L-13-0055

Cha K, & Goldenberg C (2015). The complex relationship between bilingual home language input and kindergarten children's Spanish and English oral proficiencies. Journal of Educational Psychology, 107, 935–953. 10.1037/edu0000030

Collins BA, O'Connor EE, Suárez-Orozco C, Nieto- Castañon A, & Toppelberg CO (2014). Dual language profiles of Latino children of immigrants: Stability and change over the early school years. Applied Psycholinguistics, 35, 581–620. 10.1017/S0142716412000513 [PubMed: 24825925]

Conti-Ramsden G, & Durkin K (2007). Phonological short-term memory, language and literacy: Developmental relationships in early adolescence in young people with SLI. Journal of

Child Psychology and Psychiatry, 48, 147–156. 10.1111/j.1469-7610.2006.01703.x [PubMed: 17300553]

De Houwer A (2007). Parental language input patterns and children's bilingual use. Applied Psycholinguistics, 28, 411–424. 10.1017/S0142716407070221

Dixon LQ, Wu S, & Daraghmeh A (2012). Profiles in bilingualism: Factors influencing kindergartners' language proficiency. Early Childhood Education Journal, 40, 25–34. 10.1007/s10643-011-0491-8

Ehrler DJ, & McGhee RL (2008). Primary test of non-verbal intelligence. Austin, TX: Pro-Ed.

Escobar K, & Tamis-LeMonda CS (2017). Conceptualizing variability in US Latino children's dual-language development. In Cabrera NJ & Leyendecker B (Eds.), Handbook on positive development of minority children and youth (pp. 89–106). New York, NY: Springer.

Floccia C, Sambrook T, Delle Luche C, Kwok R, Goslin J, White L, … Mills D (2018). Vocabulary of 2-year-olds learning English and an additional language: Norms and effects of linguistic distance. Monographs for the Society for Research in Child Development, 83, 30–42. 10.1111/mono.12349

Gathercole SE (2006). Nonword repetition and word learning: The nature of the relationship. Applied Psycholinguistics, 27, 513–543. 10.1017/S0142716406060383

Gathercole VCM, & Thomas EM (2009). Bilingual first-language development: Dominant language take-over, threatened minority language take-up. Bilingualism: Language and Cognition, 12, 213. 10.1017/S1366728909004015

Gibson TA, Oller DK, Jarmulowicz L, & Ethington CA (2012). The receptive-expressive gap in the vocabulary of young second-language learners: Robustness and possible mechanisms. Bilingualism: Language and Cognition, 15, 102–116. 10.1017/S1366728910000490 [PubMed: 22247648]

Giguere D, & Hoff E (2020). Home language and societal language skills in second generation bilingual adults. International Journal of Bilingualism, 24, 1071–1087. 10.1177/1367006920932221

Hakuta K (1987). Degree of bilingualism and cognitive ability in mainland Puerto Rican children. Child Development, 58, 1372–1388. 10.2307/1130628

Hammer CS, Davison MD, Lawrence FR, & Miccio AW (2009). The effect of maternal language on bilingual children's vocabulary and emergent literacy development during Head Start and kindergarten. Scientific Studies of Reading, 13, 99–121. 10.1080/10888430902769541 [PubMed: 23606802]

Hammer CS, Komaroff E, Rodriguez BL, Lopez LM, Scarpino SE, & Goldstein B (2012). Predicting Spanish-English bilingual children's language abilities. Journal of Speech, Language, and Hearing Research, 55, 1251–1264. 10.1044/1092-4388(2012/11-0016)

Hilmarsson-Dunn A, & Kristinsson AP (2010). The language situation in Iceland. Current Issues in Language Planning, 11, 207–276. 10.1080/14664208.2010.538008

Hoff E (2015). Language development. In Born-stein MH & Lamb ME (Eds.), Developmental science: An advanced textbook (7th ed., pp. 443–488). New York, NY: Psychology Press.

Hoff E (2018). Bilingual development in children of immigrant families. Child Development Perspectives, 12, 80–86. 10.1111/cdep.12262 [PubMed: 29805472]

Hoff E, Burridge A, Ribot KM, & Giguere D (2018). Language specificity in the relation of maternal education to bilingual children's vocabulary growth. Developmental Psychology, 54, 1011–1019. 10.1037/dev0000492 [PubMed: 29283595]

Hoff E, Core C, Place S, Rumiche R, Señor M, & Parra M (2012). Dual language exposure and early bilingual development. Journal of Child Language, 39, 1–27. 10.1017/S0305000910000759 [PubMed: 21418730]

Hoff E, Core C, & Shanks KF (2020). The quality of child-directed speech depends on the speaker's language proficiency. Journal of Child Language, 47, 132–145. 10.1017/S030500091900028X [PubMed: 31296271]

Hoff E, Quinn JM, & Giguere D (2018). What explains the correlation between growth in vocabulary and grammar? New evidence from latent change score analyses of simultaneous bilingual development. Developmental Science, 21, e12536. 10.1111/desc.12536

Hoff E, & Ribot KM (2017). Language growth in English monolingual and Spanish-English bilingual children from 2.5 to 5 years. The Journal of Pediatrics, 190, 241–245. 10.1016/j.jpeds.2017.06.071 [PubMed: 28803620]

Hoff E, Rumiche R, Burridge A, Ribot KM, & Welsh SN (2014). Expressive vocabulary development in children from bilingual and monolingual homes: A longitudinal study from two to four years. Early Childhood Research Quarterly, 29, 433–444. 10.1016/j.ecresq.2014.04.012 [PubMed: 25089074]

International Business Machines Corporation. (2018). IBM SPSS statistics for windows, Version 26.0 Armonk, NY: IBM Corp.

Kids Count Data Center. (2020). Annie E Casey Foundation. Retrieved from https://datacenter.kidscount.org/data/tables/81-children-who-speak-a-language-other-than-english-at-home#detailed/1/any/false/37,871,870,573,869,36,868,867,133,38/any/396,397

Lambert WE (1975). Culture and language as factors in learning and education. In Wolfgang A (Ed.), Education of immigrant students (pp. 55–83). Toronto, ON: Ontario Institute for Studies in Education.

Lauro J, Core C, & Hoff E (2020). Explaining individual differences in trajectories of simultaneous bilingual development: Contributions of child and environmental factors. Child Development, 91, 2063–2082. 10.1111/cdev.13409 [PubMed: 32738071]

Laursen B, & Hoff E (2006). Person-centered and variable-centered approaches to longitudinal data. Merrill-Palmer Quarterly, 52, 377–389. 10.1353/mpq.2006.0029

MacDonald PL, & Gardner RC (2000). Type I error rate comparisons of post hoc procedures for I j chisquare tables. Educational and Psychological Measurement, 60, 735–754. 10.1177/00131640021970871

Marchman VA, Fernald A, & Hurtado N (2010). How vocabulary size in two languages relates to efficiency in spoken word recognition by young Spanish-English bilinguals. Journal of Child Language, 37, 817–840. 10.1017/S0305000909990055 [PubMed: 19726000]

Marchman VA, Martínez LZ, Hurtado N, Grüter T, & Fernald A (2017). Caregiver talk to young Spanish-English bilinguals: Comparing direct observation and parent-report measures of dual-language exposure. Developmental Science, 20, e12425. 10.1111/desc.12425

Oh JS, & Fuligni AJ (2010). The role of heritage language development in the ethnic identity and family relationships of adolescents from immigrant backgrounds. Social Development, 19, 202–220. 10.1111/j.1467-9507.2008.00530.x

Oller DK, & Eilers RE (Eds.). (2002). Language and literacy in bilingual children. Blue Ridge Summit, PA: Multilingual Matters.

Paradis J (2011). Individual differences in child English second language acquisition: Comparing child-internal and child-external factors. Linguistic Approaches to Bilingualism, 1, 213–237. 10.1075/lab.1.3.01par

Parra M, Hoff E, & Core C (2011). Relations among language exposure, phonological memory, and language development in Spanish-English bilingually developing 2-year-olds. Journal of Experimental Child Psychology, 108, 113–125. 10.1016/j.jecp.2010.07.011 [PubMed: 20828710]

Pearson BZ (2007). Social factors in childhood bilingualism in the United States. Applied Psycholinguistics, 28, 399–410. 10.1017/S014271640707021X

Place S, & Hoff E (2011). Properties of dual language exposure that influence 2-year-olds' bilingual proficiency. Child Development, 82, 1834–1849. 10.1111/j.1467-8624.2011.01660.x [PubMed: 22004372]

Place S, & Hoff E (2016). Effects and noneffects of input in bilingual environments on dual language skills in 2½-year-olds. Bilingualism: Language and Cognition, 19, 1023–1041. 10.1017/S1366728915000322

Ribot KM, & Hoff E (2014). "¿Cómo estas?" "I'm good". Conversational code-switching is related to profiles of expressive and receptive proficiency in Spanish-English bilingual toddlers. International Journal of Behavioral Development, 38, 333–341. 10.1177/0165025414533225 [PubMed: 25750468]

Ribot KM, Hoff E, & Burridge A (2017). Language use contributes to expressive language growth: Evidence from bilingual children. Child Development, 89, 929–940. 10.1111/cdev.12770 [PubMed: 28245341]

Rose Y, & MacWhinney B (2014). The PhonBank project: Data and software-assisted methods for the study of phonology and phonological development. In Durand J, Gut U, & Kristoffersen G (Eds.), The Oxford handbook of corpus phonology (pp. 380–401). Oxford, UK: Oxford University Press.

Salkind NJ (2010). Encyclopedia of research design. Los Angeles, CA: Sage. 10.4135/9781412961288

Scheele AF, Leseman PP, & Mayo AY (2010). The home language environment of monolingual and bilingual children and their language proficiency. Applied Psycholinguistics, 31, 117–140. 10.1017/S0142716409990191

Smithson L, Paradis J, & Nicoladis E (2014). Bilingualism and receptive vocabulary achievement: Could sociocultural context make a difference. Bilingualism: Language and Cognition, 17, 810–821. 10.1017/S1366728913000813

Squires J, Potter L, & Bricker D (1999). Ages and stages questionnaire: Parent-completed child monitoring system (2nd ed.). Baltimore, MD: Paul H. Brookes.

Thordardottir E (2014). The typical development of simultaneous bilinguals: Vocabulary, morphosyntax and language processing in two age groups of Montreal preschoolers. In Grüter T & Paradis J (Eds.), Input and experience in bilingual development (pp. 141–160). Philadelphia, PA: John Benjamins.

Unsworth S (2016). Quantity and quality of language input in bilingual language development. In Nicoladis E & Montanari S (Eds.), Lifespan perspectives on bilingualism (pp. 136–196). Boston, MA: De Gruyter Mouton. 10.1037/14939-007

Wagner RK, Torgesen JK, Rashotte CA, Hecht S, Barker T, Burgess S, & Garon T (1997). Causal relations between the development of phonological processing and reading: A five-year longitudinal study. Developmental Psychology, 33, 468–479. 10.1037/0012-1649.33.3.468 [PubMed: 9149925]

Welsh SN, & Hoff E (2020). Language exposure outside the home becomes more English dominant from 30 to 60 months for children from Spanish-speaking homes in the U.S. International Journal of Bilingualism. 10.1177/1367006920951870

Winsler A, Burchinal MR, Tien H-C, Peisner-Feinberg E, Espinosa L, Castro DC, … De Feyter J (2014). Early development among dual language learners: The roles of language use at home, maternal immigration, country of origin, and socio-demographic variables. Early Childhood Research Quarterly, 29, 750–764. 10.1016/j.ecresq.2014.02.008

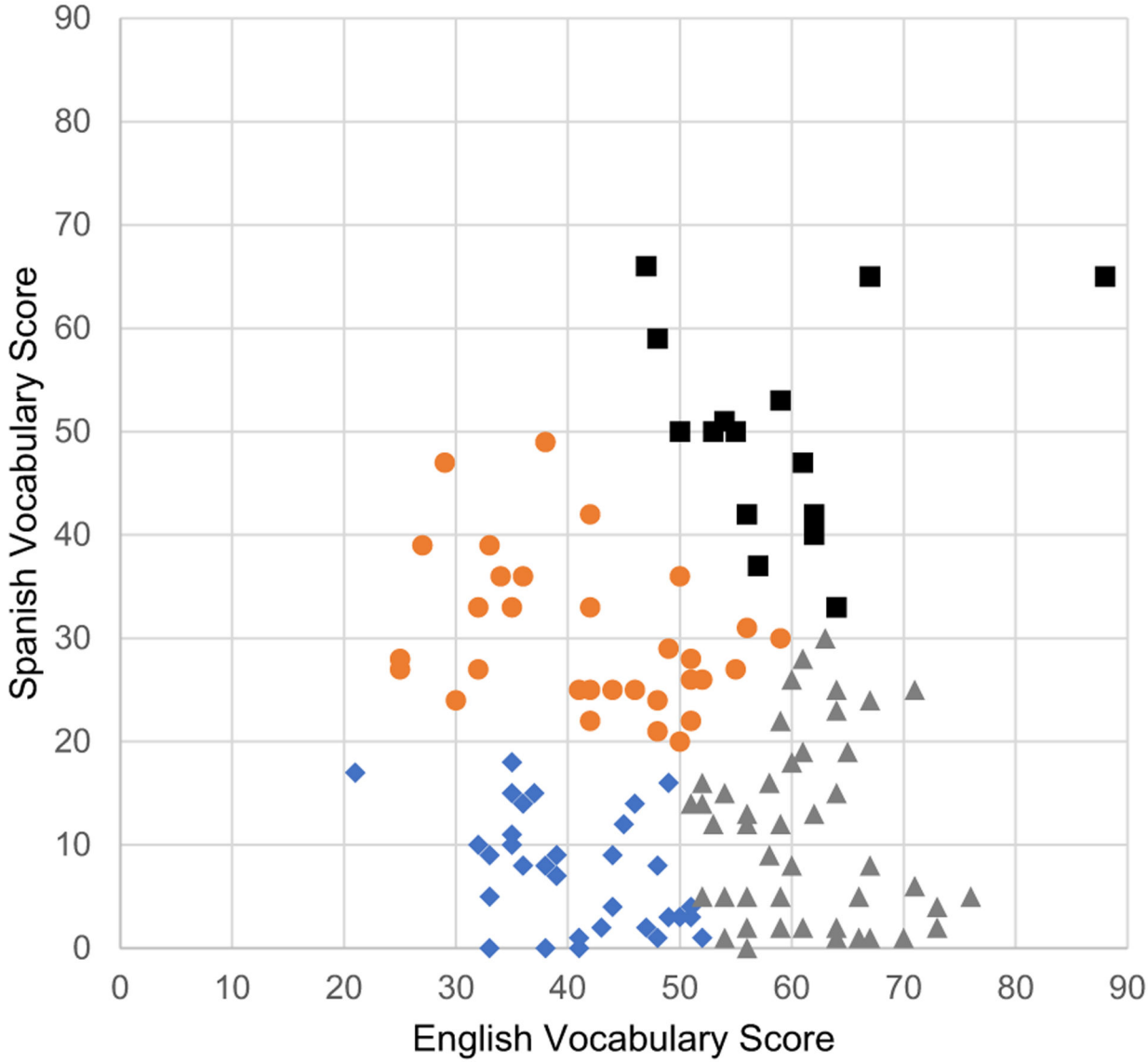

Figure 1.

Scores are raw scores from separate English and Spanish administration of the *Expressive One-Word Picture Vocabulary Test*-Spanish *Bilingual Edition. Clusters identified by K*-means *analysis*.

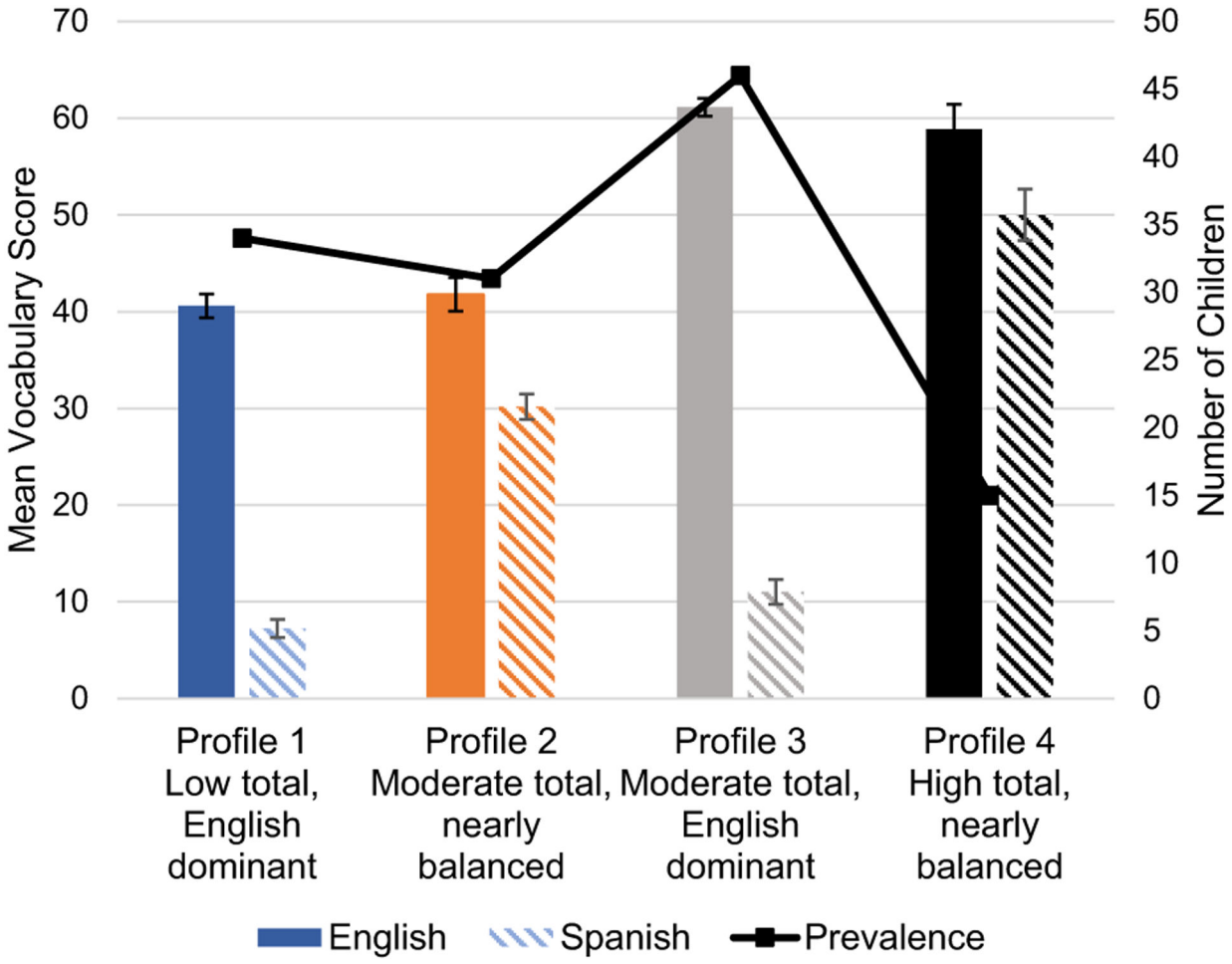

Figure 2.
Profiles presented in ascending order based on mean total (English + Spanish) vocabulary score. Error bars indicate 1 *SE* around the mean.

Table 1

Descriptive Statistics for Measures of Children's Expressive Vocabulary and Hypothesized Predictors of Dual Language Proficiency

Measure	*M (SD)*
English vocabulary score[a]	50.6 (12.5)
Spanish vocabulary score[a]	19.4 (16.4)
Total vocabulary score[b]	69.9 (20.5)
Phonological memory[c]	50.7 (26.3)
Nonverbal IQ[d]	113.1 (15.2)
Relative exposure to English at home	41.9 (27.0)
Maternal education in English[e]	1.96 (1.97)
Maternal education in Spanish[e]	2.28 (1.60)
Percent with two native Spanish, late English learner parents	49.2
Percent with one native Spanish, late English learner parent and one native English or early English learner parent	42.1
Percent with two early English learner parents or one native English and one early English learner[f]	8.7
Percent first born/only child	40.5 (49.3)

[a] *Expressive One Word Picture Vocabulary Test* (*EOWPVT*) score.

[b] Sum of English and Spanish *EOWPVT* scores.

[c] Phonological memory = % of consonants accurately repeated in a nonword repetition task in either English or Spanish, whichever was the child's higher score.

[d] Standard score on the *Primary Test of Nonverbal Intelligence*.

[e] Educational attainment scored on a 0 (*no schooling in that language*) to 5 (*advanced degree*) scale.

[f] All children have at least one parent who was born in a Spanish-speaking country and speaks Spanish at home.

Table 2

Mean Characteristics (with SDs) and Between-Profile Comparisons in Terms of Language Measures and Hypothesized Predictors of Dual Language Proficiency-Continuous Variables

	Dual language profile at 5 years						
Language measures and predictors	**1 Low total, English dominant *n* = 34**	**2 Moderate total, nearly balanced *n* = 31**	**3 Moderate total, English dominant n = 46**	**4 High total, nearly balanced n = 15**	***F*(3,122)**	**P**	**Effect size**
Language measures							
English *EOWPVT* raw score	40.59 (7.17)$_a$	41.77 (9.71)$_a$	61.13 (6.31)$_b$	58.87 (9.96)$_b$	63.07	< .001	η_p^2=.61
Spanish *EOWPVT* raw score	7.24 (5.52)$_a$	30.16 (7.39)$_b$	11.02 (8.75)$_a$	50.00 (10.32)$_c$	138.94	< .001	η_p^2=.77
Total (English + Spanish) score	47.82 (7.05)$_a$	71.94 (9.76)$_b$	72.15 (10.67)$_b$	108.87 (15.14)$_c$	125.84	< .001	η_p^2=.76
Predictors: child-internal factors							
Phonological memory[a]	40.36 (28.85)$_a$	46.29 (23.56)$_{a,b}$	54.98 (24.49)$_{b,c}$	69.33 (19.87)$_c$	5.42	.002	η_p^2=.12
Nonverbal IQ[b]	108.56 (13.70)$_a$	105.71 (14.73)$_a$	119.07 (14.03)$_b$	121.07 (12.82)$_b$	8.31	< .001	η_p^2=.17
Predictors: child-external factors							
Relative home English exposure concurrently (% of input)	43.29 (26.10)$_a$	23.71 (19.92)$_b$	59.78 (20.47)$_c$	21.13 (21.60)$_b$	21.44	< .001	η_p^2=.35
Maternal education in English	1.71 (1.82)$_{a,b}$	1.10 (1.90)$_a$	2.80 (1.85)$_b$	1.73 (2.02)$_{a,b}$	5.59	.001	η^2=.12
Maternal education in Spanish	2.00 (1.46)$_{a,b}$	2.94 (1.32)$_{b,c}$	1.72 (1.71)$_a$	3.27 (1.28)$_c$	6.65	< .001	η_p^2=.14

Note. Means with the same subscript are not significantly different, calculated using Tukey's HSD test.

[a]Phonological memory = % of consonants accurately repeated in a nonword repetition task in either English or Spanish, whichever was the child's higher score, assessed at 2.5 years.

[b]Standard score on the *Primary Test of Nonverbal Intelligence*, assessed at 5 years.

Table 3

Descriptive Statistics (Number of Children and Percentage of Profile) and Between-Profile Comparisons in Terms of Hypothesized Predictors of Dual Language Proficiency-Categorical Variables

	Dual language profile at 5 years				
Predictor	**1 Low total, English dominant n = 34**	**2 Moderate total, nearly Balanced n = 31**	**3 Moderate total, English dominant n = 46**	**4 High total, nearly balanced n = 15**	**Chi square test of independence (N = 126)**
Child-external factors, continued					
Parental family type					
2 native Spanish speakers who are late English learners	17 (27.4%)$_{a,b}$	25 (40.3%)$_{b}$	13 (21.0%)$_{a}$	7 (11.3%)$_{a,b}$	$\chi^2(6) = 24.10$
1 native Spanish speaker and late English learner, 1 native or early English learner	15 (28.3%)$_{a,b}$	5 (9.4%)$_{b}$	25 (47.2%)$_{a}$	8 (15.1%)$_{a,b}$	$p = .001$
2 early English learners or 1 early English learner and 1 native English speaker	2 (18.2%)$_{a}$	1 (9.1%)$_{a}$	8 (72.7%)$_{a}$	0 (0.0%)$_{a}$	$\varphi = .44$
Birth order					$\chi^2(3) = 5.34$
Only child/first born	9 (17.6%)$_{a}$	13 (25.5%)$_{a}$	20 (39.2%)$_{a}$	9 (17.6%)$_{a}$	$p = .15$
Later born	25 (33.3%)$_{a}$	18 (24.0%)$_{a}$	26 (34.7%)$_{a}$	6 (8.0%)$_{a}$	$\varphi = .21$

Note. Means with the same subscript are not significantly different, as calculated using the Gardner pairwise post hoc procedure (MacDonald & Gardner, 2000).