

Academic Well-being of Spanish-Speaking Kindergartners:
An Analysis of Sociodemographic Features and Teacher Characteristics

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Abstract

The number of children beginning public school in the United States who speak Spanish as their native language—Spanish-speaking kindergartners (SSK)—continues to increase. The teacher workforce should possess the characteristics and instructional and curricular tools necessary to provide these young children with meaningful early educational experiences. Using data from a nationally representative sample, this study documents sociodemographic conditions with which SSK begin school, analyzes the impact of three teacher characteristics on SSK achievement, and documents whether teacher effects vary by student sociodemographic features. On average, SSK fared lower than their peers on measures of SES, parent educational attainment, and mathematics achievement; and teacher characteristics varied between groups. Spanish-use by the teacher in the classroom was found to account for a substantial amount of variance (over 4%) of SSK mathematics achievement, where Spanish-use was associated with higher scores. The size of this effect was found to vary by sociodemographic conditions. Results are discussed in the context of preparing the teacher workforce to meet the needs of this growing population.

Introduction

The number of children beginning public school in the United States who speak Spanish as their native language continues to increase as the proportional quantity of children from Hispanic immigrant families rises. A recent analysis of a nationally representative database showed that 3 in 4 Hispanics born in 2001 in the U.S. are raised in homes which speak at least some Spanish (López, Barrueco, & Miles, 2006). Hispanic English Language Learners (ELL) lag behind their peers academically in all subjects at the beginning and throughout their early education trajectory (i.e., preschool through 3rd grade [PK-3]). These differences are attributable to processes with-in, between, and out-of-schools. Among school factors that account for achievement differences are teacher characteristics. The purpose of this paper is:

- to compare SSK to their peers in terms of mathematics achievement, socioeconomic status, parental education level, and certain teacher characteristics;
- to evaluate the impact of three teacher characteristics—a) whether Spanish is used for instruction in the classroom, b) teacher's rating of the importance of knowing English for school readiness, and c) number of years teacher has taught kindergarten—on the mathematics achievement of SSK;
- and to establish whether teacher effects vary by levels of SES, mother's education level, and English proficiency.

Data from these analyses were taken from the Early Childhood Longitudinal Study, Kindergarten Cohort (ECLS-K), which was commissioned and compiled by the National Center for Education Statistics (NCES). Descriptive statistics, *t*-tests, a non-parametric test, and a series of linear and multiple linear regressions were conducted. Results indicated that:

- Spanish-speaking kindergartners (SSK) fare a standard deviation lower than their general education peers in terms of SES and parent education.
- Compared to the SSK score substantially lower in mathematics (.8 s.d.) during the fall semester of kindergarten.
- Teachers of SSK are more likely to use Spanish in classroom instruction, less likely to perceive English proficiency as important to school readiness, and have less experience teaching kindergarten.
- Spanish-use in the classroom was found to account for a substantial amount of variance (over 4%) of SSK mathematics achievement during the fall of kindergarten, where Spanish-use was associated with higher scores.
- The effect size of Spanish-use in the classroom was found to vary by SES, level of mother's education, and English proficiency.

Background

Young Hispanic children are the largest and fastest growing ethnic minority population in the country (García, 2005; García, Jensen, Miller, & Huerta, 2005; Hernández, 2005; Montemayor & Mendoza, 2004). The size and growth of this population are due principally to immigration trends and high fertility rates among Hispanic immigrant families (Passel, 2003). In 2000, 62.3% of all Hispanic children had at least one foreign-born parent. And foreign-born Hispanic women, on average, bear 3.51 children over their lifetimes while U.S.-born Hispanics bear 2.21 children on average, and White, non-Hispanics bear 1.84 children (Durand, Telles, & Flashman, 2006; Hernández, 2005). The influx of Hispanic children born in immigrant households—the vast majority of whom are born in the U.S.—means more children enter schools speaking Spanish as their native language. In 2000, of the 6,606,207 Hispanic children

ages 0-8, 93% were born in the U.S., yet 51% lived in a home in which either the mother or father was Limited English Proficient (LEP; Hernandez, 2005). In an analysis of data from the Early Childhood Longitudinal Study, Birth Cohort (ECLS-B), López, Barrueco, and Miles (2006) describe the home language environments of Hispanic 9-month-olds in the country. They found that Hispanic infants (constituting 26% of the total infant population) resided in various sorts of home language environments. The largest group (34%) of Hispanic infants lived in a home in which Spanish was the primary language, with some English. Twenty-two percent lived in a home in which English was primarily spoken, with some Spanish; 21% in English-only homes; and 19% in Spanish only homes. The “other” category (4%) included homes in which languages other than Spanish and English (e.g., indigenous Central American languages) are used. In sum, these data demonstrate that approximately 75% of Hispanic children age 9-months lived in homes in which at least some Spanish was spoken. It should be no surprise, therefore, that the United States is the fifth largest Spanish-speaking country in the world (González, 2005).

Drawing from Public Use Microdata Sample (PUMS) by the U.S. Census 2000, it is estimated that nearly 13% of all kindergartners in the U.S. begin kindergarten as Spanish-speakers (U.S. Census, 2000). From 1980 to 2000, the number school-aged children (ages 5-19) in the U.S. who spoke Spanish at home grew over 100%—from 3.4 to 7.1 million (Fix & Passel, 2003). Moreover, The National Clearinghouse for English Language Acquisition (NCELA, 2006) reports that from the 1993-1994 to the 2003-2004 school year, K-12 enrollment of English language learners (ELL) grew over 65% while the total K-12 population grew less than 7%. Again, given the previously mentioned trends, the amount and proportion of Spanish-speaking youngsters beginning public school in the U.S. is only going to increase. While issues

surrounding the public education of Spanish-speaking children have traditionally been focal concerns of a few select states, public education systems all over the country are witnessing large increases of Hispanic immigrant students in their schools.

Prior to 1995, 3 in 4 of the nation's immigrants were found in CA, NY, TX, FL, NJ, and IL (Fix and Passel, 2003; Hernández, 2004; Passel & Fix, 2001; Schindley, 2001; Suárez-Orozco, 2001). During the late 1990s, however, many Hispanic newcomer families dispersed throughout the nation so that 2 in 3 of the nation's immigrants were found in the six traditionally immigrant states by 2000 (Fix & Passel, 2003). States that have experienced large increases in Hispanic immigrant populations are located principally across the middle of the country, including many from Rocky Mountain, Midwest, and Southeastern states. Arkansas and North Carolina experienced the largest proportional proliferation of immigrant families from 1990 to 2000, each over 300% (Guzmán, 2001).

Analyses of the ECLS-K have been very useful in documenting longitudinal academic achievement differences between racial/ethnic groups. Such analyses show, for example, that Hispanic kindergartners score significantly lower in reading and mathematics than their white and Asian peers (Denton-Flanagan & Reaney 2004; Lee & Burkam 2002; West, Denton, & Germino-Hausken, 2000). Though much of this initial academic achievement gap is accounted for by the family's socioeconomic status (SES), race/ethnicity is uniquely associated with differences in kindergartners' achievement, after controlling for SES. That is to say, Hispanics (along with African Americans) tend to achieve at lower levels than whites and Asians on the reading and mathematics during the initial years of school within each SES quintile. Recent analyses of ECLS-K data show that Hispanics score lower than their Asian and white, non-Hispanic peers from kindergarten through 3rd grade (Rathbun, West, & Germino-Hausken, 2004;

Reardon & Galindo, 2006). Reardon and Galindo (2006) found that the Hispanic-white gaps are large at kindergarten entry and narrow slightly (in math) by the end of 3rd grade. Gaps in math and reading were found to be largest for 1st and 2nd generation immigrant children from Mexican, Central American, and Puerto Rican origins.

While the primary source of difference in early academic outcomes between students and groups of students is the home (i.e., out-of-school processes), school factors also impact early achievement. Indeed, Reardon (2003) has shown that achievement differences between racial/ethnic and SES groups in kindergarten and first grade are partly due to within-school process. Differential impacts of schooling have been a longstanding concern among educational researchers. Some potentially important types of within-school differences found in other research include teacher assignment practices (Hanushek, Kain, & Rivkin, 1998; Ferguson, 2003; Oakes, 1985), instructional practices and/or curricula form and content, teacher expectations and perceptions (Hauser, Sirin, & Stipek, 2003; Good, 1987; Stipek, 2004), ability of teachers and administrators to communicate effectively with parents (Lareau, 1989), and cultural and linguistic mismatches between children/parents and teachers and administrators (Fuligni, 1997).

As a shift in the U.S. is being made to being formal schooling at age 4 with the increase of preschool access (García et al., 2005; Jamieson, Curry, & Martinez, 2001), it is important that the teacher workforce meet the needs of the children they serve. Special attention should be given to the educational quality and cultural and developmental appropriateness of content and instruction of PK-3 programs. This means understanding the intersection of student demographic features with teacher characteristics that are associated with better student outcomes.

Research suggests that teacher characteristics—e.g., level and quality of professional training, years of teaching experience, expectations of student, perceptions of student effectiveness, and instructional practices—have been shown to influence how well students perform academically in the classroom. Hanushek, Kain, & Rivkin (1998), for example, found that variations in teacher quality—measured by disentangling ‘teacher-specific’ components total school impact—proved to be the most important school variable to account for achievement differences in 4th to 5th grade mathematics and reading achievement gains. Teacher quality was found to have an impact over and above student characteristics, curriculum, and class size. At least 7.5%—a lower bound estimate—of the total variation in student achievement was accounted for by variations in teacher quality. Authors provided reasons to believe the true percentage was “considerably larger” than 7.5. In a similarly structured study, Wright, Horn, & Sanders (1997) examined the relative magnitude of teacher quality on student achievement—(math total, reading total, language total, social studies, and science in third, fourth, and fifth grades) while simultaneously considering the influences classroom context variables of heterogeneity among students and class size. Results showed that teacher effects were dominant factors affecting student academic achievement and variables of classroom heterogeneity and size had relatively little influence on achievement. Thus, empirical research using multi-level designs with large and representative samples suggest that the teacher matters—variations in teacher quality contribute substantially to academic achievement differences between students.

Teacher quality for young Hispanics ELL students means understanding and strategically incorporating language and culture into class content and instructional practices (García, Jensen, & Cuéllar, 2006). It is posited that by bridging school-home cultural and linguistic divides through a linguistically competent and culturally responsive teacher workforce, the student-

teacher relationship is more trusting (García & Levin, 2001; Ramírez, 2003), parents become more involved in the school (Buysse, Castro, West, & Skinner, 2004; Espinosa, 1995), and student performance increases (García, 1991; García & Levin, 2001; Ovando, Collier, & Combs, 2006, pg. 214-218; Seitzinger-Hepburn, 2004).

Purpose of Study

Analyzing ECLS-K data, this study offers some descriptions of the educational and sociodemographic profile of Spanish-speaking kindergartens (SSK) and seeks to determine the existence and size of the effects of three teacher characteristics on their early mathematics achievement scores.

Much of the scholarly work on the effects of teacher characteristics on academic outcomes of language minority students has been theoretical and/or based on qualitative data extracted from small samples (e.g., Delgado-Gaitain, 2004; García, 1991; Valdés, 1996; Valenzuela, 1999). While qualitative and ethnographic work are vital to understanding interactions and negotiations among institutions and individuals who influence educational outcomes of language minority students, they are criticized for lacking statistical power and generalizability (August & Shanahan, 2006; Ercikan & Roth, 2006).

Quantitative studies and controlled experiments evaluating the impacts of teacher variables on student outcomes also introduce certain shortcomings. First, these tend to evaluate teacher impacts on student outcomes without considering differences by student characteristics (e.g., SES, race/ethnicity, geographic attributes, linguistic/cultural background). Second, large scale studies of teacher quality on student outcomes usually fail to evaluate specific teacher characteristics, but develop an overall composite of ‘teacher quality’. For example, Hanushek (1997) and Hanushek, Kain, and Riukin (1998) estimated teacher quality by controlling for

between-school, within-school, and individual variations in student achievement. “Teacher quality” in these studies, therefore, was operationalized as an omnibus, sociological force—particular instructional practices or teacher characteristics that bear more or less influence on levels of student achievement were not evaluated. This study seeks to fill gaps in the literature by conducting quantitative analyses using data from a nationally representative sample to evaluate the effects of specific teacher characteristics, looking at sociodemographic differences among the largest segment of the ELL population in the country: young Spanish-speaking children.

The purpose of this study is:

- to compare SSK to the general body of kindergartners on measures associated with low academic achievement (SES, mother education level, father education level);
- to analyze the direct effect of three teacher characteristics—a) whether Spanish is used for instruction in the classroom, b) teacher’s rating of the importance of knowing English for kindergarten readiness, and c) years teacher has taught kindergarten—on SSK’s mathematics achievement;
- and to establish whether teacher effects vary by levels of SES, mother’s education level, and English proficiency.

It is hypothesized that each of the teacher characteristic variables included in the model (see Figure 1) affects the academic achievement (mathematics in the present design) of SSK.

Empirical evidence suggests that expectations and perceptions of teachers are influenced by their amount of teaching experience—one study found that younger teachers were more likely to hold belief systems that impact the amount of sensitivity to their students (Stuhlman & Pianta, 2001).

Additionally, specific to needs of SSK, teachers who effectively integrate Spanish into the curriculum and see that the child communicates in his/her native language in order to

communicate needs, wants, and thoughts are more likely to further the academic attainment of their monolingual, Spanish-speaking students (García, 1991; Genesee, 1994; Krashen, 1992; Ovando et al., 2006; Reguero de Atilas & Allestaht-Snyder, 2002)—while those teachers who identify the child knowing English as an important aspect of school readiness are not. However, we could not locate a study which empirically assessed the influence these particular teacher characteristics on academic achievement outcomes using a nationally representative dataset.

Methods

Dataset

All data used in this study were collected by NCES as a part of a nationally representative, longitudinal study of children in the United States who began kindergarten in fall of 1998. This study, the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) represents an effort to accumulate information on children's early school experiences from kindergarten through fifth grade. The ECLS-K provides descriptive information on children's status at school entry, their transition into school, and their progression through fifth grade. The longitudinal nature and nationally representative sample of children ($N = 19,173$ at base-year), teachers, and schools in the ECLS-K dataset enable researchers to study how a wide range of family, school, community, and individual variables interact with early school performance over time.

Participants

A sample of Spanish-speaking kindergartners (SSK; $n = 1,185$) were characterized by their reported linguistic ability and use. That is, the SSK target sample was identified using two language variables from the database: whether the school indicated that child speaks Spanish at home, and whether parents indicated that child speaks Spanish at home. In addition, only

children who were enrolled in kindergarten for the first time and those who had the same teacher in the fall and spring were included in the sample.

Descriptive statistics and nonparametric tests of SSK measures were analyzed and compared to those of the general population of kindergartners. The comparison group ($n = 15,577$) was comprised of a mixture of children who spoke mostly English as well as other non-English languages (excluding Spanish) at home. They were also first-time kindergartners and had the same teacher in the fall and spring of kindergarten. This comparison group was developed in order to examine descriptive statistics, independent-samples t -tests, and nonparametric tests to see how SSK fare in a variety of dimensions compared to general body of kindergarten peers in the nation.

Analyses

A detailed explanation of the analytic methods—including an in depth description of the dataset, sampling methods, variables, and data analysis procedures—can be found online at http://www.ecehispanic.org/work/jensen_research_thesis.pdf. Several variables were used in data analyses. Some were used exclusively to define SSK and comparison samples while others were used in preliminary analyses and/or analyses to test the theoretical model. Detailed information related to these variables is listed in Table 1. These data were gathered from parent interviews, teacher questionnaires, school administrator questionnaires, and direct assessments with the child (NCES, 2001).

The dependent variable in the model is a measure of children's mathematics achievement scores during the fall semester of their kindergarten year. This measure was selected for two reasons: a) early numeracy skills (i.e., mathematics) tend to correlate strongly with overall academic achievement in early education, and b) mathematics is less linguistically loaded than

other academic achievement measures (i.e., reading domains). The content of the mathematics tests were identical to those used in the “Mathematics Framework for the 1996 National Assessment of Educational Progress (NAEP)” (NAGB, 1996) and included standardized tasks associated with the identification of numbers and shapes, counting, size relativity, and ordinal patterns. This test was given orally and language skills were minimally requisite—if SSK were found to not be proficient in English, the test was given in Spanish. Direct assessments during the fall semester of kindergarten were carried out over a 14-week period that began in September and ended in early December (NCES, 2001, p. 123).

Descriptive statistics and *t*-tests were first conducted on seven ordinal/continuous dimensions: a) socioeconomic status, b) mother’s level of education, c) father’s level of education, d) teacher perception of importance that child knows English to be ready for kindergarten, e) years teacher has taught kindergarten, f) teacher rating of child’s “approach to learning”, and g) mathematics achievement score in the fall of the kindergarten year.

Subsequently, means from the SSK population were contrasted to those of the comparison group via independent-samples *t*-tests.

A nonparametric test was also conducted to determine the distributional allocation and descriptive differences between the SSK and comparison group on the variable that indicated whether Spanish was used in instruction in the classroom (a dichotomous measure). To do this, a Mann-Whitney *U* test was conducted to evaluate differences in medians values.

The theoretical model (see Figure 1) was tested next using regression methods. The first multiple linear regression model was conducted to determine whether the three teacher characteristic variables substantially and uniquely predicted variation in SSK mathematics

academic achievement. Three separate standardized regression coefficients—one for each teacher characteristic—and their respective effects sizes (r^2) were computed.

For the teacher characteristics that yielded substantial effect sizes (i.e., $r^2 \geq .01$), predicting the variation in SSK mathematics achievement, additional regressions were conducted by levels of SES, mother's education level, and English proficiency. Because mothers of SSK were unequally distributed into educational attainment levels, these categories were adjusted slightly so that cell sizes at each level were large enough to provide sufficient statistical power (see Table 2). Sample distribution by SES and English Proficiency are shown in Table 3.

Results

Results from descriptive statistics and mean comparison tests are shown in Table 4. Because a large number of cases were included in the comparisons, all seven *t*-tests were statistically significant. Cohen's *d* was used to determine the effect size of each comparison, where .20 of a pooled standard deviation (s.d.) represents a "small" difference, .50 s.d. represents a "moderate" difference, and .80 s.d. represents a "large" difference (Cohen, 1988; Rosenthal & Rosnow, 1991, 1996). *T*-tests comparing SSK to their peers on sociodemographic measures (i.e., SES, mothers education level, father's education level) indicated large differences of an entire s.d. for each measure—SSK were much lower. The fall mathematics achievement difference was also large at .79 s.d.—the mean score for SSK was much lower.

T-tests comparing groups by teacher characteristics were also informative. Teachers' perception of the importance that the child knows English to be ready for kindergarten was .91 s.d. lower for SSK compared to teachers of the general kindergarten population. Teachers of SSK reported less years of experience teaching kindergarten—a mean difference of 2.11 years or .27 s.d.

The result of the Mann-Whitney U test was significant and in the expected direction, $z = -50.30, p < .001$ (see Table 5). SSK were more likely than the comparison group to be in a class in which Spanish was used during instruction. Specifically, 55.3% of SSK and 7.2% of the comparison group were in a class that used at least some Spanish during classroom instruction.

A scatter plot analysis supported the use of a linear regression model (as opposed to a cubic, quadratic, or other curvilinear relationship) testing the effects of three teacher characteristics on the fall mathematics achievement of SSK. The linear combination of teacher characteristics was significant and substantially related to SSK's fall semester mathematics achievement score, $F(3, 258,775) = 4,038.24, p < .001$. The multiple correlation coefficient was .21, indicating that approximately 4.5% of the variance of SSK mathematics achievement could be accounted for by the linear combination of teacher characteristic measures. Indices indicating the relative strength (standardized parameter coefficients and partial r^2) of the individual predictors in this model are shown in Table 6. Of the three, the only uniquely significant and substantial predictor was the variable that measured whether Spanish was used for instruction in the classroom. This variable alone accounted for 4.1% of the variance of SSK mathematics achievement.

Descriptive statistics of SSK mathematics achievement by SES quintiles, mother's level of education, and English proficiency are found in Table 7. As shown, large amounts of SSK come from poor homes, are not proficient in English, and have mothers with little formal education. Moreover, means and standard deviations of mathematics achievement gradually increase from the lowest to highest levels of SES, mother's level of education, and from non-English-proficiency to proficiency. This means that English proficient SSK who come from higher socioeconomic conditions and whose parents have more formal education, on average,

had higher mathematics achievement scores and demonstrated slightly greater within-group variability in their scores.

Table 8 shows differences in the frequency of Spanish-use in the classroom by SES, mother's education level, and English proficiency. A pattern from lower to higher levels of SES and mother's education level, and from non-English-proficiency to English proficient shows decreasing probabilities of Spanish-use for instruction in the classroom, where non-English proficient SSK from the lowest SES quintile whose parents have less than an eight grade education are the most likely to receive at least some classroom instruction in Spanish. On the other hand, English proficient SSK in higher SES quintiles whose parents have a college degree are less likely to receive Spanish instruction in the classroom.

The size of the effect of Spanish use in classroom instruction on the fall mathematics achievement of SSK was found to vary by SES, mother's level of education, and English proficiency (see Table 9). English proficient SSK from higher levels of SES and whose mothers had more formal education were more likely to benefit from Spanish-use in the classroom in terms of their achievement in mathematics. An exception to this trend was noted: the mathematics achievement of SSK in the highest SES quintile was noted associated with the integration of their native language into classroom instruction. This, however, may have been due to the small sample size of SSK within the highest SES quintile ($n = 59$). Further research is needed to ascertain the relationship between sociodemographic characteristics and the impact of non-English language instruction on achievement patterns of ELL students. Longitudinal analyses assessing these questions will be especially informative.

Discussion

Results from this study offer insights into the complex reality of disadvantage in the early

education of the largest language minority population in the United States—Spanish-speaking youngsters—and some ways in which teacher characteristics and student sociodemographic features interact with early achievement. Additionally, it suggests ways to improve—even if modestly—early academic outcomes for Spanish-speaking kindergartners (SSK). Namely, the inclusion of Spanish in classroom instruction positively influences the early achievement of SSK, though at variable rates across student sociodemographic features.

Preliminary analyses revealed stark differences between SSK and their peers in terms of early achievement, sociodemographic features, and teacher characteristics. SSK, on average, were found to be from much poorer and less (formally) educated homes; and their mathematics achievement scores, on average, were much lower (.79 s.d.) than their peers. This isn't necessarily surprising given the well-documented associations between early academic achievement, low SES, parent education, and racial/ethnic and language minority status.

Mean differences in teacher characteristics between SSK and their peers were particularly interesting. These comparisons revealed that teachers of SSK, on average, were more sensitive to the second language development of ELL than teachers of the general body of kindergartners. They were more likely to use Spanish during classroom instruction and were less likely to perceive English proficiency as important to school readiness (.91 s.d. difference). In addition, teachers of SSK had less experience teaching kindergarten than teachers of the general body of kindergartners—an average difference of 2.11 years. Further research is needed to document factors that contribute to—and the practical effects of—having teachers with less experience on student engagement and achievement.

Of the three teacher characteristics included in the model, the only one to predict a notable amount of variance in SSK mathematics achievement was Spanish-inclusion in

classroom instruction (over 4%). This finding is particularly noteworthy. It aligns well with the psycholinguistics literature on early cognitive and language development of language minority children—of the importance of first language maturation to the underlying cognitive and second development during the early, formative years (August & Shanahan, 2006). It suggests that early educators who integrate the students' non-English native language into the classroom are better equipped to meet the academic needs of their young language minority pupils.

Descriptive statistics of student achievement across levels of SES, mother's level of educational attainment, and students' English proficiency were also revealing. These analyses revealed that a large majority of SSK are poor and have parents with little formal education—over 56% are found in the bottom SES quintile and nearly half of their mothers did not finish high school. Moreover, 3 in 5 did not demonstrate oral English proficiency. Not surprising, a relationship between sociodemographic features and mathematics achievement was noted, where higher SES and mother's level of education and student English proficiency were associated with higher scores. These three categories are not exclusive, but are inextricably related (see Table 10). SSK from a higher SES are likely to be English proficient, to have better (formally) educated parents, and to perform better in school.

Some educational economists would argue that differentiated success in school is attributable to differing amounts of capital in the home, and achievement differences across the sociodemographic features in this study are simply evidence of this reality. Some regard this as difference in human capital, while others would identify achievement variations by sociodemographic features as differences in cultural, social, financial, or polity capital (Miller, 1995, pp. 88-90). Whatever the label, it is critical that further research, policy, and practice

continue to identify processes (within and outside the school) which contribute to the academic well-being of young Spanish-speakers in U.S. schools. This cannot be done without particular attention to issues of language and culture (García et al., 2005). Empirical, multilevel strategies that leverage the cultural and linguistic context and abilities of ELL children need to be designed, tested, and implemented. Unfortunately, little is being done in this regard, which is at least partially due to the fact that the infrastructure to fund research and development of empirically designed and tested strategies for subpopulations of education disadvantage is limited.

SSK with higher levels of “capital” were less likely to be in a classroom in which the teacher used Spanish during instruction (see Table 8). This is quite interesting given the fact that these same children, on average, benefited more from Spanish inclusion—in terms of their mathematics achievement—than those with lesser levels of “capital” (see Table 9).

Some limitations to this study should be mentioned. Each limitation implies the need for further research. First, analyses in this study only involved mathematics performance during the few first months of kindergarten. Longitudinal analyses are necessary to determine the extent to which the impact of Spanish inclusion in classroom continues to influence achievement patterns and whether this effect continues to differ by sociodemographic features over time.

Second, previous studies have shown that the vast majority of the variation in achievement scores during the fall semester of kindergarten are due to out-of-school processes (Lee & Burkam, 2002; Reardon, 2003), including whether the child was enrolled in some type of preschool program (García et al., 2005). It would be valuable to assess ways in which teacher characteristics interact with out-of-school processes—e.g., literacy practices in the home, parent-

child interactions, and involvement in educational activities in the community—to influence variations in early achievement.

Third, this study only analyzed the effects of a select few teacher characteristics on the early achievement of SSK. If research is to translate into enlightened policy and practice, it is necessary, among several other domains, to continue investigating specific teacher attributes—e.g., level and quality of professional training, years of teaching experience, expectations of student, perceptions of student effectiveness, instructional practices, outreach to and inclusion of parents—that bear on academic progress throughout the elementary school years.

Fourth, ways in which variables were measured presented limitations. The variable concerning Spanish inclusion in the classroom was very simplistic. The question posed to teachers stated, “What languages are used for instruction in your class(es)?”, and provided “Spanish” in the list of options. Hence, the only information related to native language inclusion in the classroom was whether or not Spanish was used. We do not know, for example, how much Spanish was used in proportion to English, in which contexts it was used, for which academic areas, or the extent to which children were allowed and encouraged to respond in Spanish. These are only a few aspects in need of additional investigation in order to understand more thoroughly the role of Spanish and native language inclusion in early education.

Another element of language the ECLS-K does not report on is the oral Spanish proficiency of all Spanish speakers. Oral Spanish proficiency was only tested on those Spanish speakers who did not pass the English oral proficiency exam; Spanish proficiency was not tested for those Spanish speakers who demonstrated English proficiency. This is unfortunate because a lack of oral bilingual proficiency for all Spanish speaking children prevents analyses involving the intersection of cognitive and linguistic attributes between languages and cross-language

transfer of cognitive skills. It also would be useful to have more information related to the level of bilingual language proficiency of the parents, as well as the amount and quality of linguistic interactions with their young children. Further research examining the interplay of Spanish and English as well as the role of parent-child interactions should implement thorough, mixed method designs. These will prove most useful to the accurate assessment of dual-language ability, and will help to form viable approaches to enhancing linguistic and cognitive outcomes that integrate parents.

Finally, this study focused primarily on outcomes of SSK, and only minimally alluded to process. It is critical to understand academic achievement differences between groups (e.g., mathematics achievement disparities between SSK and their peers). However, it is just as imperative to evaluate the contextual process that contribute to, minimize, and/or exacerbate such differences. For example, it is not enough for us to know that Spanish-use in the classroom partially sustains early mathematics achievement of SSK—we need more data and analysis on process. What is it about native language inclusion that nourishes early academic success? Is the process social in nature, emotional, cognitive, linguistic, or a combination of each? Indeed, further research and mixed method designs are needed to thoroughly understand process, not just the prevalence of differences. These data will be especially important and enlightening to policy and practice in early education.

Recommendations for Teacher Preparation

These findings—even given the aforementioned limitations—as well as other research (Bowman, Donovan, & Burns, 2001) suggest that teacher characteristics are important variants in determining the educational achievement of all children. Moreover, in a recent review of the literature on how children from economically, linguistically and culturally diverse backgrounds

can be better served it was suggested that the incorporation of students' home language into the daily classroom activities should be an imperative (Espinosa, 2005). This present study shows that SSK are more likely to receive Spanish instruction in comparison to children from the general population. Although we do not have a clear idea of the degree to which Spanish is used in the classroom, this study finds that it, on average, positively influences SSK's mathematics achievement.

Unfortunately, research suggests that teachers generally feel ill equipped to educate ELL students. A recent study of elementary and secondary teachers in California emphasized the value of more and better training that can help them meet the learning needs of ELL students more effectively as well as the need for stronger Spanish skills (Gándara, Maxwell-Jolly, & Driscoll, 2005). One suggestion is to recruit bilingual high school students into elementary education teaching programs. An example of an educational policy change that is needed and likely to improve the education of Spanish speaking students was initiated at Arizona State University (ASU). All new teacher candidates in the early education program at ASU are required to be able to communicate in Spanish or one of the indigenous languages in Arizona (García & González, 2006). This change in curricular requirements will indubitably have a positive effect on the state's need for bilingual teachers.

References

- August, D., & Shanahan, T. (Eds.) (2006). *Report of the national literacy panel on language minority youth and children*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Bowman, B., Donovan, S., & Burns, M. (Eds). *Eager to learn: Education our preschoolers*. Washington DC: National Academy Press.
- Buysee, V. Castro, D. C., West, T. & Skinner, M. L. (2004). *Addressing the needs of Latino children: A national survey of state administrators of early childhood programs. Executive summary*. Chapel Hill. The University of North Carolina, FPG Child Development Institute.
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Hillsdale, NJ: Lawrence Erlbaum Associates.
- Delgado-Gaitan, C. (2004). *Involving Latino families in schools: Raising student achievement through home-school partnerships*. Thousand Oaks, CA: Corwin Press.
- Denton-Flanagan, K., & Reaney, L. (2004). *Entering kindergartners' knowledge and skills*. Paper presented at American Educational Research Association annual meeting, April 13, 2004, San Diego, CA.
- Durand, J., Telles, E., & Flashman, J. (2006). The demographic foundations of the Latino population.
- Ercikan, K., & Roth, W-M. (2006). What good is polarizing research into qualitative and quantitative? *Educational Researcher*, 35(5), 14-23.
- Espinosa, L. M. (1995). *Hispanic parent involvement in early childhood programs*. Retrieved August 17, 2006 from <http://www.ericdigests.org/1996-1/hispanic.htm>
- Espinosa, L. M. (2005). Curriculum and assessment considerations for young children from culturally, linguistically and economically diverse backgrounds. *Psychology in the Schools*, 42, 837-853.
- Ferguson, R. (2003). Teachers' perceptions and expectations and the black-white test score gap. *Urban Education*, 38(4), 460-507.
- Fix, M., & Passel, M. (2003). *U.S. immigration: Trends and implications for schools*. Washington, DC: The Urban Institute.
- Fuligni, A. (1997). The academic achievement of adolescents from immigrant families:

- The roles of family background, attitudes, and behavior. *Child Development*, 68, 351-363.
- Gándara, P., Maxwell-Jolly, J. & Driscoll, A. (2005). *Listening to teachers of English language learners. A survey of California teachers' challenges, experiences, and professional development needs*. Santa Cruz, CA: Policy Analysis for California Education, Center for the Future of Teaching and Learning, and U.C. Linguistic Minority Research Center.
- García, G., & Levin, M. (2001). *Latino children in head start: family characteristics, parent involvement and satisfaction with the Head Start program*. Retrieved from http://www.acf.hhs.gov/programs/opre/hs/faces/pres_papers/latino_children/latino_childr_en.pdf
- García, E. (1991). Effective Instruction for language minority students: The teacher. *Journal of Education*, 173(2), 130-141.
- García, E. (2005). *Teaching and learning in two languages: Bilingualism and schooling in the United States*. New York: Teachers College Press.
- García, E. & González, D. (2006). *Pre-K and Latinos: The foundation for America's future*. Washington DC: Pre-K Now.
- García, E., Jensen, B., & Cuéllar, D. (2006). Early academic achievement of Hispanics in the United States: Implications for teacher preparation, *The New Educator*, 2, 123-147.
- García, E., Jensen, B., Miller, L. S., & Huerta, T. (2005). *Early childhood education of Hispanics in the United States*. Tempe, AZ: The National Task Force on Early Childhood Education for Hispanics.
- Genesee, F. (1994). *Educating second language children: The whole child, the whole curriculum, the whole community*. New York: Cambridge University Press.
- Good, T. (1987). Two decades of research on teacher expectations: Findings and future directions. *Journal of Teacher Education*, 38(4), 32-47.
- González, J. (2005). *Speculations on the future of the Spanish language in the United States of America*. Paper presented at the 5th International Symposium on Bilingualism in Barcelona, Spain.
- Guzmán, B. (2001). *The Hispanic population: Census 2000 brief*. Washington, DC: U.S. Census Bureau. [ED 454 363](#).
- Hanushek, E. (1997). Assessing the effects of school resources on student performance: An update. *Educational Evaluation and Policy Analysis*, 19, 141-164.

- Hanushek, E., Kain, J., Rivkin, S. (1998). *Teachers, schools, and academic achievement*. Cambridge, MA: National Bureau of Economic Research.
- Hauser, C., Sirin, S., & Stipek, D. (2003). When teachers' and parents' values differ: Teachers' ratings of academic competence in children from low-income families. *Journal of Educational Psychology*, 95(4), 813-20.
- Hernández, D. (2004). *Demographic Change and the Life Circumstances of Immigrant Families*. Foundation for Child Development. University of Albany, SUNY.
- Hernández, D. (2005). *Young Hispanic children in the U.S.: A demographic portrait based on Census 2000*. University at Albany, State University, NY: A report to the National Task Force on Early Childhood Education for Hispanics.
- Jamieson, A., Curry, A., & Martinez, G. (2001). *School enrollment in the United States: Social and economic characteristics of students, October 1999*. Washington, D.C.: U.S. Department of Commerce, Economics and Statistics Administration, U.S. Census Bureau.
- Krashen, S. (1992). *Fundamentals of language education*. Torrance, CA: Laredo Publishing.
- Lareau, A. (1989). *Home advantage: Social class and parental intervention in elementary education*. London, UK: Falmer Press.
- Lee, V., & Burkam, D. (2002). *Inequality at the starting gate: Social background differences in achievement as children begin school*. Washington, D.C.: Economic Policy Institute.
- López, M., & Barrueco, S. (2006). *Latino infants and families: A national perspective of protective and risk factors for development*. A report to the National Task Force on Early Childhood Education for Hispanics.
- Miller, L. S. (1995). *An American imperative: Accelerating minority educational advancement*. New Haven, CT: Yale University Press.
- Montemayor, R., & Mendoza, H. (2004). *Right before our eyes: Latinos past, present, and future*. Tempe, AZ: Scholarly Publishing.
- National Assessment Governing Board [NAGB] (1996). *Mathematics framework for the 1996 National Assessment of Educational Progress*. Washington, DC: Government Printing Office.
- National Center for Education Statistics [NCES] (2001). *User's manual for the ECLS-K*

base year public-use data files and electronic codebook. Washington, D.C: NCES 2001-029 (revised).

National Clearinghouse for English Language Acquisition [NCELA] (2006). *The growing numbers of limited English proficient students: 1993-94-2003/04*. Office of English Language Acquisition (OELA): U.S. Department of Education.

Oakes, J. (1985). *Keeping track: How schools structure inequity*. New Haven, CT: Yale University Press.

Ovando, C., Collier, V., & Combs, V. (2006). *Bilingual and ESL classrooms: Teaching in multicultural contexts, 4th ed.* New York, NY: McGraw-Hill.

Passel, J. (2003). *Hispanic projections: The future and the past*. Presented at the National Research Council Panel on Hispanics in the U.S., Washington, DC, November 13, 2003.

Passel, J., & Fix, M. (2001). *U.S. immigration at the beginning of the 21st century: Testimony before the subcommittee on immigration and claims hearing on "The U.S. Population and Immigration" committee judiciary, U.S. House of Representatives*. Washington, DC: Immigration Studies Program, The Urban Institute.

Ramírez, A. Y. F. (2003). Dismay and disappointment: parental involvement of Latino immigrant parents. *The Urban Review*, 35(2) 93-110.

Rathbun, A., West, J., & Germino-Hausken, E. (2004). *From kindergarten through third grade: Children's beginning school experiences* (NCES 2004-007). U.S. Department of Education, National Center for Educational Statistics. Washinton, DC: U.S. Government Printing Office.

Reardon, S. (2003). *Sources of educational inequality: The growth of racial/ethnic and socioeconomic test score gaps in kindergarten and first grade*. Population Research Institute. Pennsylvania State University.

Reardon, S. & Galindo, C. (2006). *K-3 academic achievement patterns of Hispanics and other racial/ethnic groups*. Paper presented at the Annual American Education Research Association Conference in April 2006. San Francisco, CA.

Reguero de Atilas, J., & Alleksaht-Snyder, M. (2002). Effective approaches to teaching young Mexican immigrant children. *Eric Digest*, EDO-RC-02-13.

Rosenthal, R., & Rosnow, R. (1991). *Meta-analytic procedures for social research*. Newbury Park, CA: Sage.

Rosenthal, R., & Rosnow, R. (1996). Computing contrasts, effect sizes, and

- counternulls on other people's published data: General procedures for research consumers. *Psychological Methods*, 1, 331-340.
- Schmidley, D. (2001). *Profile of the foreign-born Population in the United States: 2000*. U.S. Census Bureau, Current Population Reports, Series P23-206, Washington, D.C.: U.S. Government Printing Office.
- Seitzinger-Hepburn, K. (2004). *Building culturally and linguistically competent services to support young children, their families, and school readiness*. Baltimore, MD: Annie E. Casey Foundation.
- Stipek, D. (2004). The early childhood classroom experience observation measure. *Early Childhood Research Quarterly*, 19(3), 375-97.
- Stuhlman, M., & Pianta, R. (2001). Teachers' narratives about their relationships with children: Associations with behavior in classrooms. *School Psychology Review*, 31(2), 148-163.
- Suárez-Orozco C. (2001). Afterward: Understanding and serving the children of immigrants. *Harvard Educational Review*, 71(3), 579-589.
- U.S. Census Bureau (2000). *Current Population Survey: Statistical Abstract of the United States, 2000*. Ethnic and Hispanic Statistics Branch, Population Division, U.S. Census Bureau, Washington D.C.: U.S. Government Printing Office.
- Valdés, G. (1996). *Con respeto: Bridging the distances between culturally diverse families and schools—An ethnographic portrait*. New York: Teachers College Press.
- Valenzuela, A. (1999). *Subtractive schooling: U.S.-Mexican youth and the politics of caring*. New York: SUNY
- West, J., Denton, K. and Germino-Hausken, E. (2000). *America's kindergartners*. Washington, DC, National Center for Education Statistics.
- Wright, P., Horn, S., & Sanders, W. (1997). Teacher and classroom context effects on student achievement: Implications for teacher evaluation. *Journal of Personnel Evaluation in Education*, 11, 57-67.

Tables and Figures

Table 1.

ECLS-K Variables Used in Analyses.

Variable Name	Variable Description	Variable Source	Variable Type
C1SPHOME	child speaks Spanish in home	fall direct assessment	dichotomous (Yes/No)
P1LANGS1	child speaks Spanish in the home	fall parent interview	dichotomous (Yes/No)
P1FIRKDG	first-time kindergartners	fall parent interview	dichotomous (Yes/No)
T1_ID	fall teacher identification number	n/a	string
T2_ID	spring teacher identification number	n/a	string
WKSESQ5	socioeconomic status	parent composite	ordinal
WKMOMED	mother's educational level	Parent composite	ordinal
WKDADED	father's educational level	Parent composite	ordinal
A2CSPNH	Spanish used for instruction	spring teacher questionnaire A	dichotomous (Yes/No)
B1ENGLAN	importance that child knows English	fall teacher questionnaire B	ordinal
B1YRSKIN	years taught kindergarten	fall teacher questionnaire B	continuous
T1LEARN	teacher rating of child's "approach to learning"	fall teacher questionnaire SRS	ordinal
C1MSCALE	IRT mathematics achievement score	fall direct assessment	continuous
C1SCTOT	Total OLDS score	fall direct assessment	continuous

Table 2.

Mother's Education Level of Spanish-Speaking Kindergartners

Previous Level Code	Previous Level Label	<i>n</i> (% of sample)	Revised Level Code	Revised Level Label	<i>n</i> (% of sample)
1	8th grade or below	363 (30.6%)	1	8th grade or below	363 (30.6%)
2	9th to 12th grade	211 (17.8%)	2	9th to 12th grade	211 (17.8%)
3	High School Completion	309 (26.1%)	3	High School Completion	309 (26.1%)
4	Voc/Tech Program	62 (5.2%)	4	Some College or Voc/Tech program	207 (17.5%)
5	Some College	145 (12.2%)	4	Some College or Voc/Tech program	207 (17.5%)
6	Bachelor's Degree	56 (4.7%)	5	College Degree (BA, MA, Doctorate)	83 (7.0%)
7	Some Grad/Professional School	9 (.8%)	5	College Degree (BA, MA, Doctorate)	83 (7.0%)
8	Master's Degree	11 (.9%)	5	College Degree (BA, MA, Doctorate)	83 (7.0%)
9	Doctorate Degree	7 (.6%)	5	College Degree (BA, MA, Doctorate)	83 (7.0%)

Table 3.

SES and English Proficiency of Spanish-Speaking Kindergartners

	<i>n</i>	% of SSK sample
SES Quintile		
Lowest	671	56.6
Second	223	18.8
Third	131	11.1
Fourth	101	8.5
Highest	59	5.0
English Proficiency		
Proficient	472	39.8
Not Proficient	709	59.8
Data Missing	4	.4

Table 4.

Descriptive Statistics and Independent Samples Comparisons of Mean Values

Variable	Group	Mean	S.D.	Pooled S.D.	Mcg-M _{ssk}	<i>d</i>
Categorical SES measure (quintiles)	Comparison group	3.20	1.36			
	SSK	1.80	1.15	1.40	1.40*	1.00
Mother's level of education	Comparison group	4.42	1.69			
	SSK	2.70	1.66	1.76	1.72*	0.98
Father's level of education	Comparison group	4.57	1.92			
	SSK	2.65	1.79	1.99	1.92*	0.96
Importance child knows English entering kindergarten	Comparison group	3.50	0.96			
	SSK	2.58	1.1	1.01	0.92*	0.91
Years teacher has taught kindergarten	Comparison group	9.27	7.85			
	SSK	7.16	6.98	7.80	2.11*	0.27
Mathematics IRT score – spring	Comparison group	19.98	7.26			
	SSK	14.26	5.19	7.28	5.72*	0.79

* $p < .001$

Table 5.

Non-Parametric Comparison of Whether Spanish is Used for Instruction in the Classroom

	Spanish used for instruction in the classroom		
	% Yes	% No	% Missing
Total	11.3	83.7	4.9
Comparison Group	7.2	88.0	4.8
SSK	55.3	38.2	6.5

Table 6.

Parameter Coefficients and Effect Sizes of Teacher Effects on Mathematics Achievement

Parameter	Standardized Coefficient	r^2*
Spanish-use in classroom	.203	.041
View of English Importance	.056	.003
Years Teaching Kindergarten	.026	.001

Table 7.

Descriptive Statistics of SSK Mathematics Achievement by SES, Mother Education Level, and English Proficiency

	<i>n</i>	% of sample	Minimum	Maximum	Mean	s.d.
SES Quintile						
1	671	56.62	6.97	42.16	13.18	4.56
2	223	18.82	7.53	31.78	14.17	4.60
3	131	11.05	7.19	35.84	15.79	5.06
4	101	8.52	7.98	38.20	18.05	6.83
5	59	4.98	8.37	43.32	19.01	6.18
Mother Education Level						
8th grade or below	363	30.95	6.97	35.82	13.05	4.41
9th to 12th grade	211	17.99	7.51	31.60	13.07	4.44
High School Completion	309	26.34	7.19	42.16	14.37	5.09
Some College or Voc/Tech program	207	17.65	8.05	43.32	16.23	5.55
College Degree (BA, MA, Doctorate)	83	7.08	7.85	38.20	17.99	6.70
English Proficiency						
Not Proficient	709	60.03	6.97	35.84	13.00	4.27
English Proficient	472	39.97	7.52	43.32	16.25	5.82

Table 8.

Frequency of Spanish-use in Classroom Instruction by SES, Mother Education Level, and English Proficiency

	<i>n</i>	% Yes	% No	% Missing Data
SES Quintile				
1	671	65.67	27.32	7.01
2	223	48.27	44.34	7.38
3	131	42.90	52.58	4.52
4	101	29.46	65.82	4.72
5	59	20.88	77.15	1.97
Mother Education Level				
8th grade or below	363	69.03	23.43	7.53
9th to 12th grade	211	55.09	39.42	5.49
High School Completion	309	56.30	36.65	7.05
Some College or Voc/Tech program	207	38.01	57.12	4.88
College Degree (BA, MA, Doctorate)	83	33.04	64.62	2.34
English Proficiency				
Not Proficient	709	69.8	22.6	7.5
Proficient	472	33.2	62.0	4.8

Table 9.

Parameter Coefficients and Effect Sizes of Spanish-use in the Classroom on Mathematics Achievement by SES, Mother Education Level, and English Proficiency

	<i>n</i>	Standardized Coefficient	<i>r</i> ²
<u>SES Quintile</u>			
Lowest	671	.078	.006
Second	223	.131	.017
Third	131	.212	.045
Fourth	101	.212	.045
Highest	59	.022	.001
<u>Mother Level of Education</u>			
8th grade or below	363	.112	.013
9th to 12th grade	211	.028	.001
High School Completion	309	.189	.036
Some College or Voc/Tech program	207	.226	.051
College Degree (BA, MA, Doctorate)	83	.183	.034
<u>English Proficiency</u>			
Not Proficient	472	.029	.001
Proficient	709	.155	.024

Table 10.

Bivariate Correlations between SES, Mother Level of Education, and English Proficiency

Variables	SES	Mother Level of Education	English Proficiency
SES	1		
Mother Level of Education	.74*	1	
English Proficiency	.37*	.33*	1

* $p < .01$

Figure 1.

Theoretical Model: The Impact of Teacher Characteristics on Mathematics Achievement of SSK

