Language Background and Early Academic Achievement: Disentangling Language-Minority Status, Social Background, and Academic Engagement

CSE Technical Report 679

Marcel Paret
University of California, Berkeley

May 2006

Center for the Study of Evaluation
National Center for Research on Evaluation,
Standards, and Student Testing
Graduate School of Education & Information Studies
University of California, Los Angeles
GSE&IS Building, Box 951522
Los Angeles, CA 90095-1522
(310) 206-1532

The work reported herein was supported under the National Center for Education Statistics, Institute of Education Sciences, Award Number Q3036031101, as administered by the American Institutes for Research, Office of English Language Acquisition, Language Enhancement, and Academic Achievement for Limited English Proficient Students, U.S. Department of Education.

The findings and opinions expressed in this report do not reflect the positions or policies of the National Center for Education Statistics; the Institute of Education Sciences; the American Institutes for Research; the Office of English Language Acquisition, Language Enhancement, and Academic Achievement for Limited English Proficient Students; or the U.S. Department of Education.

Acknowledgements

A number of people and institutions have contributed to the production of this report. The research for the report was supported by funding from the Language Minority Children Analysis Project, sponsored by the National Center for Education Statistics (NCES), Institute of Education Sciences, and the National Center for Research on Evaluation, Standards, and Student Testing (CRESST). I have also benefited from crucial resources provided by W. Norton Grubb, Trond Petersen, and the people at the Berkeley Survey Research Center.

Throughout the research and writing process, Jamal Abedi, Jenny Kao, and Seth Leon at CRESST were very generous and helpful. They provided valuable guidance and feedback at different stages of the project, and helped me shape this report into a much better final product. Jenny Kao was instrumental in facilitating the development of the report on a variety of levels, answering questions, and coordinating my communication with a number of people.

Anonymous reviewers at NCES provided useful comments that have made this a better report. I also benefited greatly from attending the ECLS-K Database Training Seminar in Washington, DC, in July 2004, sponsored by NCES. The generous staff members were eager to answer questions, and helped me to become more familiar with the ECLS-K data. They were particularly valuable in helping me to identify language-minority students in the database, thus contributing to the foundation of this report.

Several individuals in the Department of Sociology at the University of California-Berkeley have also been very helpful. Samuel R. Lucas has been a mentor to me in all of my research, providing guidance and valuable feedback on drafts, and this project was no exception. Shannon Gleeson provided comments on an earlier draft, and was kind to instruct me on a variety of matters regarding immigration. Sandra Smith also offered valuable advice during the initial stages of the project.

Finally, I would like to thank a few people at MPR Associates in Berkeley, CA, where I had the opportunity to grow as a researcher, and gain many of the technical skills that have allowed me to complete this report. Bob Fitzgerald was a great teacher, and showed me the many steps involved in completing a research project. I am also grateful to Gary Hoachlander and Penni Hudis, who were instrumental in creating opportunities that contributed to my development.

Acknowledgements

This report was independently peer reviewed by scholars from the National Center for Education Statistics (NCES) and from the National Center for Research on Evaluation, Standards, and Student Testing (CRESST). The reviewers with the background to match the content of the manuscript were selected by both organizations and were anonymous to the authors.

LANGUAGE BACKGROUND AND EARLY ACADEMIC ACHIEVEMENT: DISENTANGLING LANGUAGE-MINORITY STATUS, SOCIAL BACKGROUND, AND ACADEMIC ENGAGEMENT

Marcel Paret
University of California, Berkeley

Introduction

Due to the increasing influx of immigrants from Asia and Latin America since the passage of the 1965 Immigration Reform Act, the American population has been steadily shifting. The National Research Council estimated that during the 1990s, entering immigrants accounted for 37% of the total growth in the U.S. population (Smith & Edmonston, 1997). An important element of this population shift is the use of language, as many immigrants arrive from countries where English is not the primary language. In 1990 a substantial portion (43%) of recent immigrants either spoke English "not well," or "not at all" (Smith & Edmonston, 1997: Table 8.3). Further, even if immigrants enter the country with English language skills or acquire them after arrival, there is still the possibility that they will not use English when interacting with their children. This prevalence of non-English languages suggests that examining the educational experiences of language-minority students—those for whom English is not the first language—is extremely important to larger issues of educational and social stratification.

Research shows that language-minority students both do poorly on standardized tests, and receive low academic ratings from their teachers (August & Hakuta, 1998). Explanations for the low performance, however, are limited. This is at least partially due to the fact that language-minority status is intimately entangled with issues related to race-ethnicity, socioeconomic status (SES), and immigrant status. In turn these complicating factors are associated with a variety of structural and cultural mechanisms that facilitate differences in academic achievement. In order to fully understand patterns of academic achievement among language-minority students, one must be able to disentangle the interacting and overlapping influences related to race-ethnicity, social class, and immigration.

Scholars have attempted to accomplish this task by investigating the role of various social factors in determining academic achievement, but have had only moderate success. For example, Schmid (2001) noted: "Several hypotheses have been

put forth in the literature to explain the academic performance among the new second generation. Overall, though, the relationship between socioeconomic class, cultural characteristics, social reception, and language proficiency has not been resolved" (p. 82).

This report aims to fill the gap in the literature by disentangling the relationships between language-minority status, race-ethnicity, SES, immigrant status, and academic achievement.[1] In addition, it investigates the role of one specific mechanism that may be underlying differences in academic achievement: student academic engagement. Focusing on the early academic experiences of language-minority students, the report uses data based on a nationally representative sample of students who were enrolled in a public or private kindergarten program in the 1998-99 school year.

Early Childhood Focus

The analysis examines academic achievement both at kindergarten entry and over the first two years of school. Research highlights three reasons why the early grades are particularly important for language-minority students. First, as of 1998 more than half of the language-minority student population was in early elementary school, between kindergarten and Grade 4 (August & Hakuta, 1998). Further, students' English language skills are likely to improve over the course of their academic careers.[2] Thus, directing studies to the early grades may be especially important for locating the largest and most important effects of language-minority status.

Second, the first few years of school are crucial because students gain skills that will be used in later grades (e.g., Farkas, 2003). Thus, the cumulative nature of the curriculum makes early learning essential to overall academic success (Entwisle & Alexander, 1993). Third, early academic performance has a number of social-psychological effects that are likely to impact eventual educational attainment (Hauser, Tsai, & Sewell, 1983). For example, beginning students develop both an

[1] For the purpose of the report, the trio of race-ethnicity, SES, and immigrant status are taken to represent "social background."

[2] Indeed, evidence suggests that children of immigrants are learning English at rapid rates (Schmid, 2001). For example, from a study of second-generation eighth and ninth graders in Miami-Fort Lauderdale and San Diego, Portes and Hao (1998) concluded that "knowledge of English is nearly universal among today's children of immigrants and preference for that language is dominant" (p. 270).

academic self-image and an academic reputation, which in turn affect important factors such as student motivation, parent and teacher expectations, and track placement (Entwisle & Alexander, 1993).

In sum, research shows that early performance is likely to have a lasting effect on overall academic achievement and educational attainment (Farkas, 2003; Ensminger & Slusarcick, 1992). Recent evidence for a national sample also confirms that students gain important skills during kindergarten and first grade, and that skill acquisition varies substantially by student and family characteristics such as socioeconomic background and race-ethnicity (Denton & West, 2002). This research suggests that the early grades may be especially important for understanding low trajectories of academic achievement among language-minority students.

Research Questions

This report attempts to answer four sets of questions regarding the identity, academic engagement, and academic achievement of young language-minority students.

1. What is the size of the kindergarten language-minority student population based on different definitions of language-minority status? What are the social background characteristics of language-minority students, and how do they compare to those of non-language-minority students?
2. What is the relationship between language-minority status and academic achievement at kindergarten entry? To what extent is this relationship mediated by social background characteristics, and in particular race-ethnicity, SES, and immigrant status?
3. What is the relationship between language-minority status and gains in academic achievement over the first two years of school (i.e. kindergarten and first grade)? To what extent is this relationship mediated by social background characteristics, and in particular race-ethnicity, SES, and immigrant status?
4. How does academic engagement vary with respect to language-minority status? To what extent does academic engagement relate to differences in academic achievement by language-minority status, both at kindergarten entry and over the first two years of school?

Data Source and Samples

This report is based on data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K). The ECLS-K obtained information through direct one-on-one student assessments, parent interviews, and teacher questionnaires. The findings presented here come from the first two years of the study, and pertain to student experiences during kindergarten and first grade. The full analytic sample includes 13,983 students who participated in the study during these two years.[3] These students represent the national population of 3,842,961 students who were enrolled in a United States public or private school in 1998-99. Several qualities make these data ideal for the current study: detailed information about language-minority status; large sample sizes of language-minority students; appropriate measures for studying academic progress over time; and detailed information about students' attitudes and behaviors.

Characteristics of the full analytic sample and the multivariate analysis samples (i.e. samples used in the regression analyses) are shown in Table 1.[4] The multivariate analysis samples include all students who had academic achievement data for both the fall of kindergarten and the spring of first grade. Non-English proficient students were not administered the reading and general knowledge standardized assessments. These samples include fewer Hispanic students, and have higher socioeconomic status. Though based on somewhat smaller samples due to missing data on the teacher instruments, the teacher ratings samples are fairly similar to the full, nationally representative sample. Details about the academic achievement measures and related sample restrictions are provided in the variable measurement section below.

[3] This N is based on the total number of cases with a positive value for the Y2COMW0 sample weight. This weight is appropriate for analyzing assessment data from kindergarten and first grade, in combination with data from the parent, teacher, and administrator instruments. Weighted analyses based on the sample of 13,983 students are representative of the national population of students enrolled in kindergarten in 1998-99. The analyses of academic achievement are based on slightly smaller samples. The size of these samples and potential for sample bias are discussed below in the section describing the academic achievement variables.

[4] The actual samples used in the multivariate analyses are slightly smaller than the nationally representative sample, and represent a smaller number of students (3.54 to 3.77 million for the standardized assessment samples, and 2.42 to 2.98 million for the teacher rating samples). Table 1, however, demonstrates that besides the differences mentioned in the text, these smaller samples are not systematically different than the nationally representative sample.

Weighting, Sample Design, and Statistical Procedures

The ECLS-K data were collected using a multistage sample design. Geographic areas such as counties and county groups were selected first, followed by schools within counties, and finally students within schools. In order for the results to be generalizable to the national population of students, analyses using ECLS-K data must be conducted using the appropriate sample weights. These weights account for unequal selection probabilities, sample attrition over time, and nonresponse to survey instruments. It is also necessary to account for the complex sample design when calculating standard errors to be used for determining levels of statistical significance. All of the analyses were conducted with the appropriate sample weight (Y2COMW0) for analyzing child assessment data from kindergarten and first grade, in combination with data from the parent and teacher instruments. Taylor series approximation methods were used to obtain the appropriate standard errors.

This report follows a consistent set of guidelines for reporting and interpreting results. Effects are only reported if they are statistically significant at the $p < .05$ level, and meet minimum levels of magnitude (i.e. minimum effect sizes). Bivariate differences are only reported if they are at least 5 percentage points, and mean differences are only reported if they are at least .2 standard deviations according to Cohen's d (Cohen, 1992). The regression results are reported as effect sizes, and are referred to in standard deviation (SD) units.[5] One SD unit reflects a one standard deviation change (positive or negative) in the dependent variable. The regression tables report the effect sizes associated with one-unit changes in the independent variables. For the purposes of discussion, however, effect sizes will be discussed in terms of one-unit increases in dichotomous independent variables (e.g. the SD unit change in the dependent variable associated with being male), and one SD increases in continuous independent variables (e.g. the SD unit change in the dependent variable associated with a one SD increase in income). Effects will only be reported if they are associated with at least a .05 SD change in the dependent variable.

[5] It is necessary to note that this report attempts to describe associations between key variables, such as language-minority status and academic achievement; it does not attempt to describe causal relationships. Because the ECLS-K is not an experimental design, determining causal relationships is not feasible. Thus, regression results should be interpreted as representing non-causal relationships between the independent variables and the dependent variable. While the findings are described in terms of effect sizes, the use of the word "effect" is not meant to imply causality.

Organization of the Report

The remainder of the report is organized into seven sections. The next section outlines theoretical perspectives regarding the relationships between English language proficiency, social background, and academic engagement. This is followed by a description of the variables used in the report, including the measure of language-minority status. The results are then presented in two parts. The first results section includes a descriptive analysis of social background characteristics among the various language-minority status groups, and regression analyses disentangling the relationships of language-minority status and social background characteristics to academic achievement. The regression analyses examine both academic achievement at kindergarten entry, and gains in academic achievement between the fall of kindergarten and the spring of first grade. The second results section compares the levels of academic engagement among the language-minority status groups, and introduces the academic engagement variables into the regression analyses to determine their relationship to academic achievement. The last section summarizes the results as they pertain to the research questions, and offers concluding remarks.

Language, Social Background, and Academic Engagement

Literature related to language-minority students highlights many factors related to the low academic achievement of language-minority students. This section discusses three such sets of factors that are examined in this report: 1) social background, 2) language proficiency, and 3) academic engagement. The conceptual model for these various effects is presented in Figure 1. This model posits that language-minority status[6] and social background both affect each other, have direct effects on academic achievement, and indirect effects on academic achievement via academic engagement.

[6] In this report, language-minority status incorporates distinctions regarding English language proficiency, as well as distinctions concerning students' language use at home. Details on the construction of the language-minority status variable are provided in the section on variable measurement.

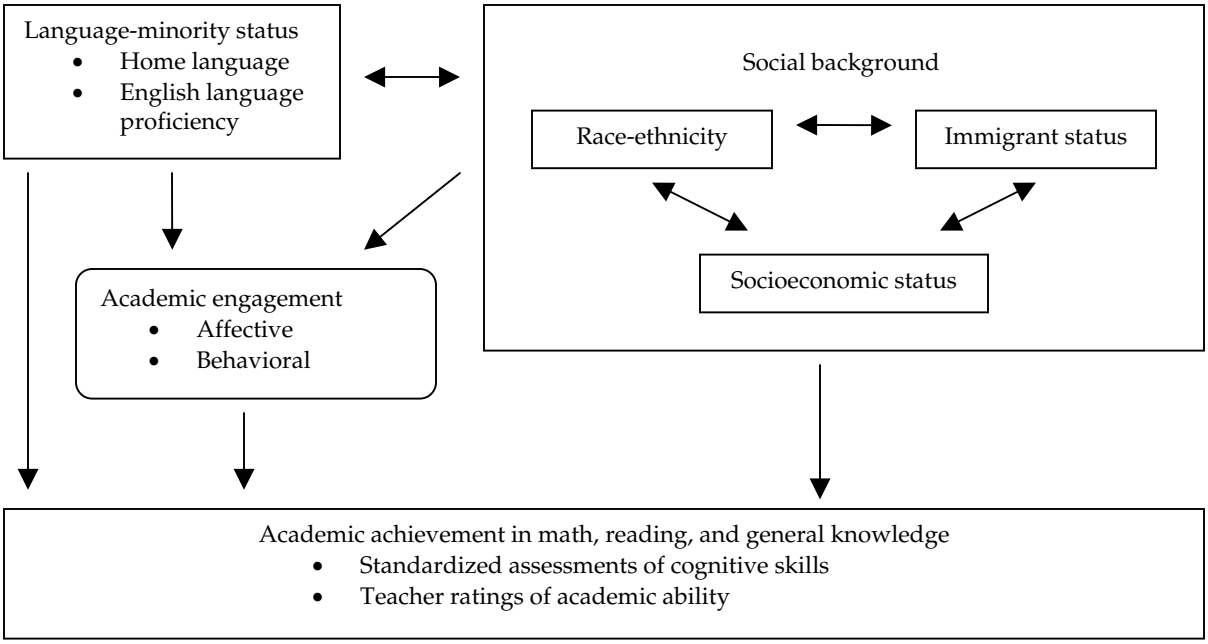

Figure 1. Conceptual model relating language-minority status, social background, academic engagement, and academic achievement.

Social Background and English Language Skills

Because English is the dominant language in the United States, foreign-born individuals and their children are more likely to use non-English languages than individuals who have family backgrounds with a long history of United States residence. Given the dominance of immigration from Asia and Latin America since the middle of the twentieth century, current first, second, and third generation immigrants are also likely to be classified and treated as racial-ethnic minorities in this country (Portes & Zhou, 1993). Finally, many immigrants, and in particular those from Latin America, come from countries poorer than the United States, arrive with limited economic resources and occupational skills, and occupy low-level positions within the American economy (Smith & Edmonston, 1997). Taken together, these patterns solidify the intimate relationship between language background, immigrant status, racial-ethnic identity, and socioeconomic status.

The traditional assimilation framework views English language proficiency as one step in a larger process of immigrant incorporation into the American mainstream (Gordon, 1964). According to this view, all immigrants follow a uniform process of cultural assimilation by which the previously used (i.e. non-English) language is traded for English. More recently, however, scholars have challenged

this view, suggesting that processes of English language acquisition vary among immigrant groups due to social factors within the American context. Among these challenging perspectives, two dominate the education literature on English language proficiency: the socioeconomic view and the sociocultural view (Rumberger & Larson, 1998; Schmid, 2001).

The socioeconomic perspective asserts that immigrant experiences vary depending on social class (Portes & Rumbaut, 1990). Portes and Rumbaut contrast the experiences of lower class immigrants who tend to settle in ethnic enclaves with those of higher class immigrants who tend to settle in more ethnically heterogeneous neighborhoods. Thus, due to the prevalence of native (i.e. non-English) language use in their communities, lower class immigrants are likely to have less pressure and fewer opportunities to gain English language skills. As a result, lower class students may be less likely than their higher class counterparts to be exposed to, and gain proficiency in, the English language.

Theoretical explanations (e.g., Becker, 1962; Bourdieu, 1977, 1984) for the well documented association between SES and academic achievement (e.g., Sewell & Hauser, 1980) are also relevant to processes of English language acquisition. Human capital theory explains that families in higher social classes have greater educational aspirations for their children, and therefore invest more in helping their children achieve educational outcomes (Becker, 1962). Similarly, cultural capital theory asserts that upper class families are able to pass on important skills and cultural attributes to their children that facilitate educational success (Bourdieu, 1977, 1984). According to these theories, English language proficiency represents a form of human or cultural capital, and therefore depends on students' social class.

In the sociocultural perspective, English language acquisition is viewed as an ethnic or cultural symbol, rather than a reflection of family investment or an attribute associated with socioeconomic status. The largest proponent of this perspective has been Ogbu (1978, 1992), who emphasized a distinction between voluntary and involuntary immigrants: voluntary immigrants are people who move voluntarily in search of greater opportunities or freedom; involuntary immigrants are people who are forced to move against their will, such as through "slavery, conquest, colonization, or forced labor" (Ogbu, 1992: p. 8). According to this perspective, European and Asian Americans are classified as voluntary minorities, and African Americans and Hispanics (many of whom are Mexican American) are classified as involuntary minorities (Rumberger & Larson, 1998).

Ogbu (1992) argues that voluntary and involuntary immigrants have very different cultural orientations toward mainstream society and education, which in turn have implications for English language proficiency (Rumberger & Larson, 1998). On one hand, voluntary minorities are eager to achieve educational success and become incorporated into the American mainstream, and therefore view English language proficiency as one piece to the larger process of assimilation. In contrast, the tense relationship between involuntary minorities and the dominant racial-ethnic group results in an oppositional culture where the immigrant group resists incorporation into mainstream society and educational success. Rumberger and Larson (1998) note: "For involuntary minorities, learning English is not viewed simply as a mechanism or skill for getting ahead; it is also considered a symbol of assimilation into mainstream culture and with it, a loss of ethnic identity" (p. 73). Thus, this theory suggests that race-ethnicity (i.e. Asian vs. Hispanic) affects English language proficiency due to varying cultural orientations.

While scholars agree that most Asian immigrants are appropriately assigned to the voluntary immigrant category (e.g. Schmid, 2001), some have argued that the classification of Hispanic immigrants as involuntary is problematic because most recent Hispanic immigrants came to the United States according to their own will (e.g. Schmid, 2001). Ogbu and Matute-Bianchi (1986), however, claim that due to discrimination and limited opportunities Mexican Americans develop an oppositional culture similar to that of African Americans. Portes and colleagues (Portes & Rumbaut, 1990; Portes & Zhou, 1993) make a similar claim, asserting that immigrant groups arrive in specific social contexts that vary according to factors such as government policy and reception by mainstream society. In turn this social context, which tends to vary along racial-ethnic lines, shapes how immigrant groups adapt to life in American society, and therefore may influence their use of the English language.

In sum, theory about the incorporation of immigrants into the education system suggests that English language proficiency is closely related to students' social background. More specifically, SES, racial-ethnic identity, and status as a first- or second-generation immigrant are all likely to influence students' language-minority status. Further, these factors have been shown to be associated with academic achievement. Racial-ethnic and social class disparities in academic achievement are well document in the literature (e.g., Kao & Thompson, 2003), and the influences of each exist independent of the other (e.g., Jencks & Phillips, 1998;

Lee & Burkam, 2002). The results on recent immigrant status are mixed, showing positive effects in some cases and negative effects in others (Kao & Thompson, 2003).

This research suggests that in order to understand the academic achievement of language-minority students it is important to consider the roles played by race-ethnicity, SES, and immigrant status. Previous findings suggest that socioeconomic factors account for a substantial portion, but not all, of the low academic achievement among language-minority students (Schmid, 2001). As a result, some scholars have suggested that a combination of socioeconomic and sociocultural factors may contribute to differences in educational success (Rumberger & Larson, 1998). This report adds to the literature by parsing out the independent relationships between academic achievement and the various social background factors, and determining how these relationships are associated with disparities in academic achievement between different language-minority status groups.

Language Proficiency Effects

There are several reasons why language-minority status, and in particular English language proficiency, may have an effect on academic achievement beyond the effects of social background (Warren, 1996). For example, as a result of the dominant use of the English language in schools, students with limited English proficiency may experience communication difficulties, and confront teachers who are unprepared to teach them (Schmid, 2001; Warren, 1996). Scholars have also noted extreme segregation (i.e. from native English speakers) in poor urban schools and overrepresentation in special education classes as possible reasons for the low performance of students with limited English proficiency (Schmid, 2001; Zhou, 1997).

In contrast, research suggests that proficiency in non-English languages may have positive effects on academic achievement (Rumberger & Larson, 1998; Schmid, 2001). This finding is consistent with the sociocultural perspective, as bilingual students "have the English-language skills to function effectively in school without abandoning their [native] language and culture that enable them to maintain an identity and to function effectively in their families and communities" (Rumberger & Larson, 1998, 73). Bilingualism has also been shown to facilitate cognitive development (August & Hakuta, 1998) and greater access to ethnic support systems (Schmid, 2001; Zhou, 1997), both of which may positively impact levels of academic achievement.

Academic Engagement

While the education literature presents the socioeconomic and sociocultural perspectives in opposition to each other, as discussed above socioeconomic resources and cultural orientation may work in concert to determine language-minority students' academic trajectories. One factor that is associated with both social class and culture is academic engagement: students' attachment to the educational institution and engagement in academic activities.

Arguments concerning academic engagement are popular among proponents of the sociocultural perspective (Ogbu, 1992). For example, Ogbu (2003) argues that disengagement from academics—both in terms of attitudes towards school and academically relevant behaviors—is a primary feature of oppositional cultures among involuntary minorities. Evidence also indicates that students from higher socioeconomic backgrounds may have more favorable attitudes towards school and greater engagement in academic activities (Lareau, 2003; Cook & Ludwig, 1998). For example, Lareau (1987, 2003) explains that middle class students are more likely than poor and working-class students to engage in academic activities outside of school, have a positive disposition towards school, and effectively manage life in the academic setting.

Rumberger and Larson (1998) characterize the socioeconomic perspective by its emphasis on educational values and skills (e.g. English language proficiency), and the sociocultural perspective by its emphasis on attitudes and behaviors. Both of these perspectives, however, highlight the potential importance of academic engagement: placing a high value on education and having a positive attitude towards the education system may both facilitate greater involvement in, and attachment to, academic activities. Evidence also suggests that academic engagement is a key mechanism for explaining differences in educational success between language-minority students with different levels of English language proficiency (Rumberger & Larson, 1998). Thus, both theory and evidence indicate that academic engagement may play an important role in determining academic achievement for language-minority students.

Scholars studying academic engagement stress the distinction between affective engagement and participatory or behavioral engagement (Johnson, Crosnoe, & Elder, 2001; Carbonaro, 2005). Referring to it as "school attachment," Johnson, Crosnoe, and Elder (2001) explain the affective component as "the extent to

which students 'feel' that they are embedded in, and a part of, their school communities" (p. 320). In contrast, the behavioral component includes participation in academic activities, such as trying hard and being attentive in class and completing homework (Johnson, Crosnoe, & Elder, 2001). Some have conceptualized this behavioral component as representing students' effort within the educational setting (Carbonaro, 2005). This report examines the extent to which variation in affective and behavioral engagement relates to differences in academic achievement among language-minority status groups.

Variable Measurement

This section describes the five types of variables used in the report: language-minority status, social background, academic engagement, academic achievement, and additional controls. Descriptive statistics for the variables are provided in Table 19.

Language-Minority Status

The ECLS-K includes two pieces of information that are useful for identifying language-minority students. First, parents were asked what languages were spoken at home, and which of these languages were primary and secondary in terms of use. Based on these responses students are organized into three categories (see Table 2, panel A): (1) English was the only language spoken at home (78%); (2) a non-English language was spoken at home, but English was the primary language spoken (10%); and (3) the primary language spoken at home was not English (12%).

The second measure of language-minority status comes from standardized assessments of proficiency in the English language. Prior to administering cognitive assessments in math, reading, and general knowledge, field workers consulted school records (and teachers, if no information was available on the student file) to determine whether or not each student had a non-English language background. Students with a non-English home language were then administered a language screener, the Oral Language Development Scale (OLDS), to assess their proficiency in the English language. Designed to measure "listening comprehension, vocabulary, and ability to produce language," the OLDS included three sets of tasks: responding to oral commands given in English (e.g. touching an ear, picking up an object), describing pictures using English, and retelling stories that had been read to them in English. Students who passed an established cut score on the OLDS

assessment were identified as proficient in the English language. Based on these results students are classified into three groups (see Table 2, panel A): 1) student was identified as an English speaker, and did not take the exam (87%), 2) student took the exam and passed (6%), and 3) student took the exam and failed (7%).

The OLDS assessment data extends the parent-provided information by determining language proficiency among students who were from homes where English was not the primary language. Among these students 36% met the cut score necessary to be considered proficient in the English language.[7] The cross tabulation of home language and English language proficiency is provided in Table 2, panel B. Both sources of information were used to construct a composite language-minority status variable. This variable reflects three distinctions: 1) the presence or absence of a non-English language at home, 2) whether or not the non-English language spoken at home was the primary language spoken, and 3) whether or not the student was proficient in the English language.[8] These distinctions translate into the following four language-minority status categories (see Table 2, panel C):

- Native English (NE): English was the only language spoken at home (77.8%).
- Language exposure (LE): a non-English language was spoken at home, but English was the primary language spoken (9.2%).
- Language-minority/Fluent (LM/Fluent): a non-English language was the primary language spoken at home, and the student was proficient in the English language (5.9%).
- Language-minority/Limited (LM/Limited): a non-English language was the primary language spoken at home, and the student was not proficient in the English language (6.3%).

[7] This percentage is based on those students who were actually administered the OLDS assessment. Unfortunately, 19 percent of the students whose primary home language was not English were not administered the English language assessment. These students, however, were most likely proficient in the English language, as they were indicated as native English speakers by the school, and administered the English battery of cognitive assessments in math, reading, and general knowledge. This report considers these students to be English proficient.

[8] Students whose primary home language was English are assumed to have been proficient in the English language. There is a handful of students who are part of this group, were administered the OLDS assessment, and did not meet the English proficiency cutoff score. These students are set to missing language-minority status, along with those who have missing data on either measure. In total the missing cases represent less than 1% of the sample.

For this report, students in the LM/Fluent and LM/Limited categories are considered to be language-minority students. These categories are nonetheless treated separately to reflect a distinction in language proficiency shown to be important in previous research (Schmid, 2001). The LE group represents a distinction within the population of native English speakers that is not often recognized. These students nonetheless have different exposure to non-English languages as compared to the NE group, and it is therefore appropriate to consider these groups separately in an analysis of language background.

These narrowly defined groups allow for a thorough examination of the educational consequences that are associated with different types of language-minority status. Students in the LM/Limited group have minimal personal English language skills, and both language-minority groups (LM/Limited and LM/Fluent) are less likely than other students to receive English language support at home.[9] While the ECLS-K does not provide a measure of non-English language proficiency, students in the LM/Fluent and LE groups are most likely to be bilingual, with English and non-English as their respective second languages.

Social Background

Three sets of social background variables are used: race-ethnicity, socioeconomic status (SES), and immigrant status. Students are classified into five main racial-ethnic groups: 1) White, non-Hispanic (hereafter referred to as "White"), 2) Black, non-Hispanic (hereafter referred to as "Black"), 3) Hispanic (any race), 4) Asian, Native Hawaiian, or Pacific Islander (hereafter referred to as "Asian"), and 5) a residual category including Native Americans, Alaskan Natives, and multiracial students (hereafter referred to as "other race"). For descriptive purposes only the Hispanic and Asian categories are broken down into more detailed subcategories. The three Asian subcategories include the following ethnic origin groups: 1) Chinese, Japanese, Korean, and Asian Indian, 2) Filipino, Vietnamese, Hmong, and other Asian groups (hereafter referred to "other Asian"), and 3) Asian students for which detailed subgroup data are unavailable. The three Hispanic subcategories include the following ethnic origin groups: 1) Mexican, Mexican American, and

[9] This report does not investigate parental English language proficiency. Nonetheless, it is logical to assume that parents for whom English is not the primary language are less likely than their primary English counterparts to be able to provide support that requires English language proficiency (e.g. help with homework, dealing with individuals at the school).

Chicano, 2) Puerto Rican, Cuban, and other Spanish, Hispanic, or Latino groups (hereafter referred to as "other Hispanic"), and 3) Hispanic students for which detailed subgroup data are unavailable.

Socioeconomic status is represented by three variables: parental education, annual household income, and parental occupational status. All three variables are derived from information provided by parents during the kindergarten (1998-99) school year. Parental education is defined by three categories representing the highest level of education attained by either parent. These categories include a high school diploma or less, some postsecondary education but less than a bachelor's degree, and a bachelor's degree or higher. Annual household income is measured in thousands of dollars earned by the entire household. Parental occupational status is the highest occupational status score among the two parents, and reflects the social status of the parent's occupation. The occupational status score is calculated by averaging the 1989 General Social Survey (GSS) socioeconomic index (SEI) scores for all of the occupations in the corresponding 1980 United States Census occupational category.[10]

Immigrant status is measured using two dichotomous variables indicating whether or not students and their mothers were born outside of the United States. Both of these variables have a positive value for first-generation immigrant students, only the latter variable is positive for second-generation immigrant students, and both variables are zero if the student was a third-generation or higher immigrant, or did not descend from immigrants.

Academic Engagement

Following the literature on academic engagement, the variables in the analysis are separated into affective and behavioral measures. The affective measures are based on student expressions of positive and negative attitudes towards school, as indicated by parents. Dummy variables were constructed to indicate whether students exhibited each of the following six reactions to school at least once a week on average over the first two months of the kindergarten year: 1) said good things about school, 2) said they liked the teacher, 3) said they looked forward to school, 4) complained about school, 5) was upset or reluctant to go to school, and 6) pretended to be sick in order to stay home from school. Based on these dummy variables, a

[10] For more information on the GSS occupational status scores, see Nakao and Treas (1992).

"school attitude" composite variable (Cronbach's alpha = .63) was constructed counting the number of positive responses (i.e. including positive responses to the first three positive indicators, and negative responses to the last three negative indicators).

Information about participation in academic activities, both inside and outside of school, came from parent surveys and teacher questionnaires. The parent-reported measure of out-of-school activity is a dichotomous variable indicating whether or not the student read to herself or others at least three times in the previous week. In-school behaviors are measured by two teacher-reported variables. The first measure is a dichotomous variable indicating whether or not the teacher believed the student "usually" or "always" worked to the best of her ability. The second measure is a scaled score ranging from one to four capturing the extent to which the student exhibited effective "approaches to learning" (i.e. according to the teacher). The scale measures "behaviors that affect the ease with which children can benefit from the learning environment," and in particular "attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization" (NCES, 2001: p. 2-16).[11]

In the ideal case, measurement of academic engagement would reflect information provided by the students themselves, in addition to the measures used here. Given the age of the students, however, this was not possible. Thus, it is important to be careful when interpreting the meaning of these externally imposed definitions of academic engagement. Derived from reports of student participation in concrete activities (e.g. reading, or making a specific statement about the teacher), the parent-based measures are likely to be fairly objective representations of student actions. In contrast, the teacher-based variables are subjective interpretations of student work habits and the ability to manage academic environments. It is therefore important to recognize that the teacher-reported variables are not objective measures of student habits and capacities, but rather measures of student engagement with the educational institution.

[11] For more information on the approaches to learning scale, see the *User's Manual for the ECLS-K Base Year Public-Use Data Files and Electronic Codebook* (NCES, 2001).

Academic Achievement

The ECLS-K includes two types of variables appropriate for measuring academic achievement: standardized assessments of cognitive ability, and teacher ratings of academic ability. For each type, students were evaluated in three areas: language and literacy (hereafter referred to as "reading"), mathematical thinking (hereafter referred to as "math"), and basic science and social studies (hereafter referred to as "general knowledge"). Students were evaluated in both the fall of kindergarten and the spring of first grade, allowing for an investigation of progress over the first two years of school.[12]

The two types of academic achievement measures are qualitatively different (see Table 3). The standardized assessments are one-on-one evaluations of cognitive ability administered by project fieldworkers who are more likely to be unbiased participants. These measures are ideal for examining cognitive development, as they represent an objective measure of cognitive ability with respect to the same exact set of skills at each point in time. In contrast, the teacher academic ratings are composite scores based on teacher responses to questionnaire items about students' cognitive abilities. These measures are less objective because teachers may be biased due to their active participation in the learning process and social relationship with students. In addition, the teacher academic ratings measure different (i.e. grade appropriate) skills and are completed by different teachers in kindergarten and first grade. Based on the differences, it is appropriate to consider the standardized cognitive assessments as measures of cognitive ability, and the teacher academic ratings as measures of academic standing with respect to the educational institution (i.e. represented by the teacher).

It is necessary to note two important sample restrictions. First, all non-English proficient students were excluded from the reading and general knowledge standardized assessments, and only those who were proficient in Spanish were administered the math standardized assessments. Spanish-speaking students who did not pass the standard OLDS assessment were administered a Spanish equivalent of the OLDS (Spanish OLDS), and only those students who were determined to be proficient in Spanish were then administered a Spanish version of the standardized math assessment. The reading and general knowledge assessments were only

[12] For more detailed information about the academic achievement measures, refer to the National Center for Education Statistics manuals (NCES, 2001, 2002).

administered in English. Second, students who did not successfully transition to the first grade (4%) do not have teacher ratings based on the set of first grade skills, and are not included in the teacher rating analyses.

Most studies of academic achievement focus on standardized test scores, grades, and educational attainment as the main dependent variables (e.g. Kao & Thompson, 2003). By examining teacher ratings of academic ability this analysis expands the picture to include measures more contingent on social context. This added focus is important for two reasons. First, teacher perceptions and expectations of academic ability are important variables which can influence achievement trajectories and overall levels of educational success (Ferguson, 1998). Second, because students with limited English proficiency were not administered the reading and general knowledge standardized assessments, the teacher academic ratings provide an otherwise lost opportunity to examine the academic achievement of language-minority students in these subjects.

Additional Controls

The analyses also include a small set of additional variables which are included as controls in the regression models. These variables include a dichotomous variable indicating whether or not students are male, and a variable measuring students' age in years at the time of the fall of kindergarten direct child assessment. The models also include a variable indicating whether or not students were previously retained in kindergarten, and therefore repeating kindergarten in 1998-99. The models examining gains in achievement between the fall of kindergarten and the spring of first grade include a variable measuring the number of days in between the two assessments.

Disentangling the Relationship between Language-Minority Status, Social Background, and Academic Achievement

This section on language-minority status, social background, and academic achievement includes three parts. Part one presents a descriptive analysis, showing how social background characteristics vary depending on language-minority status. Parts two and three employ regression techniques to isolate the independent effects of language-minority status and the various components of social background on academic achievement. Part two examines academic achievement at kindergarten

entry, and part three examines gains in academic achievement between the fall of kindergarten and the spring of first grade.

Social Background Characteristics by Language-Minority Status

In order to disentangle the complicated relationships between language-minority status, social background, and academic achievement, it is first necessary to understand the more basic relationship between language-minority status and social background. Accordingly, the following discussion presents summary statistics on social background for each of the four language-minority status groups (i.e. NE, LE, LM/Fluent, LM/Limited), showing the percentages of students that fall into each of the racial-ethnic, socioeconomic status, and immigrant status categories.

A brief review of the social background characteristics for each of the language-minority status groups reveals the complexity involved in studying language background, as language-minority status has substantial implications for racial-ethnic identity, socioeconomic status, and immigrant status (see Table 4). As expected, first- and second-generation immigrants and Hispanic students (Mexican in particular) are over-represented among the language-minority groups [checks #1-#8]. The LM/Limited group is 84% Hispanic, 63% Mexican, and 83% have mothers who were not born in the United States. Similarly, the LM/Fluent group is 66% Hispanic, 33% Mexican, and 68% have foreign-born mothers. Just under half of the students in the language exposure group are Hispanic, and a quarter of the mothers were foreign-born. Asian students are also over-represented among the language-minority groups, especially the LM/Fluent group (18%), though they represent smaller percentages of these groups than do Hispanic students.

The descriptive analysis also shows differences among the language-minority status groups with respect to parental education, parental occupational status, and annual household income. LM/Fluent and LM/Limited students in particular have lower status than do NE students on all three measures, and LM/Limited students are the most socio-economically disadvantaged (checks #9 - #20). Three-quarters of the parents in the LM/Limited group have at most a high school diploma (compared to only 34% of the NE group), and the average annual income for this group is substantially less than that of the NE group ($22,000 compared to $54,000).

These patterns are consistent with both of the dominant perspectives in the literature (i.e. socioeconomic and sociocultural), as well as the traditional

assimilation perspective that claims immigrants follow a process of gradual English language acquisition. Language-minority students, and in particular those with limited English proficiency, have lower socioeconomic status, are most likely to identify with a racial-ethnic group that has been identified as involuntary (i.e. Mexican), and are most likely to be first- or second-generation immigrants. The next section seeks to understand how these factors are associated with the relationship between language-minority status and academic achievement.

Academic Achievement at Kindergarten Entry

With an understanding of the relationship between language-minority status and social background, the next step is to determine how these factors relate to academic achievement. Regression analysis is used to isolate the independent relationships of language-minority status and the social background characteristics to academic achievement at kindergarten entry, measured in the fall of the kindergarten year.[13] For each of the six dependent variables (i.e. academic achievement measures), five regression models are presented. An initial model includes (1) language-minority status and a small set of controls[14] as independent variables, and academic achievement as the dependent variable. Social background is not controlled in the first model. The next three models add a single set of social background variables—(2) race-ethnicity, (3) SES, or (4) immigrant status—to this initial model. The last model includes (5) language-minority status and all three sets of social background variables.

[13] For a small percentage of students (about 4%) who were repeating kindergarten during the 1998-99 school year, the dependent variables do not measure academic achievement at kindergarten entry, as these students entered kindergarten in an earlier year.

[14] All of the models control for age, gender, and whether the student was repeating kindergarten in 1998-99. Age and gender are important variables that are known to impact academic achievement, and must be controlled in order to ascertain the true effect of language-minority status. The descriptive statistics in Table 4 show that age and gender do not vary substantially among the language-minority status groups. Though retention in kindergarten does vary slightly by language-minority status, the analysis here aims to compare the academic achievement of students who are in similar structural locations (e.g. at the beginning of the schooling process). Because students who were retained in kindergarten were in a very different structural location than the first-time kindergartners, it is necessary to control for this difference. This approach, as opposed to dropping the students who were repeating kindergarten, allows for a better representation of the national population of language-minority students.

The effects on standardized assessment scores are presented in Tables 5, 6, and 7, and the effects on teacher ratings are presented in Tables 8, 9, and 10. Language-minority status and the control variables explain 12% of the variance in standardized math and general knowledge scores, 5% of the variance in standardized reading scores, and between 7% and 11% of the variance in academic teacher ratings depending on the subject. Among the social background variables, SES accounts for the most additional variance in academic achievement. For example, adding SES to the initial model (1) for standardized math scores increases the explained variance from 12% to 29% [$F(4,430)=182.71$, $p<.001$], and though statistically significant [$F(6,428)=21.88$, $p<.001$] the further addition of race-ethnicity and immigrant status (model 5) only explains an additional 1% of the variance. Race-ethnicity, however, does explain a substantial amount of variance in standardized general knowledge scores [$F(4,429)=118.50$, $p< .001$]. These variables (model 2) explain an additional 12% of variance beyond the initial model (1), and along with immigrant status (model 5) add an additional 5% of explained variance beyond the SES-only model (3).

The results show that language-minority students enter kindergarten with lower levels of academic achievement than do NE students. This holds regardless of the subject being studied (i.e. math, reading, or general knowledge), and regardless of how academic achievement is measured (i.e. by standardized assessment or teacher rating). In the fall of kindergarten, on average LM/Limited students scored .89 standard deviations below NE students on the standardized math assessments, and .62, .89, and .67 standard deviations below NE students on the math, reading, and general knowledge academic teacher ratings. Similarly, LM/Fluent students scored .25, .27, and .69 standard deviations below NE students on the math, reading, and general knowledge standardized assessments, and .33, .46, .and .34 standard deviations below NE students on the math, reading, and general knowledge teacher ratings.

No statistically significant differences were detected with respect to LE students on the math and reading standardized assessments, but LE students did score .23 standard deviations below NE students on the standardized general knowledge assessments, and .15, .16, and .18 standard deviations below NE students on the math, reading, and general knowledge teacher ratings.

These findings provide strong evidence that language-minority students begin school already trailing their NE counterparts. For each of the dependent variables,

models 2, 3, and 4 examine the extent to which including specific sets of social background characteristics alters the relationship between language-minority status and academic achievement. In all six cases, the negative effects associated with LM/Limited and LM/Fluent students decrease once the race-ethnicity or SES variables are included. This is consistent with other results: language-minority students were more likely to be Hispanic and had lower SES than NE students (see Table 4), two characteristics which are significantly associated with lower levels of academic achievement (Tables 5-10, models 2, 3, and 5). Conversely, when the immigrant status variables are added to the math and reading models (both standardized assessments and teacher ratings), the negative effects associated with LM/Limited and LM/Fluent students increase. Because language-minority students were more likely than NE students to be first- or second-generation immigrants, this would suggest that such immigrant status has a positive effect on academic achievement. Statistically significant and positive effects associated with immigrant status, however, are only detected for standardized reading scores (Table 6, model 4), and these effects are not detected once race-ethnicity and SES are controlled (model 5).

While race-ethnicity and SES account for substantial portions of variance in outcomes and effects associated with language-minority status, language-minority students still have lower academic achievement than do NE students once the full set of social background variables is controlled (model 5 in the tables). Independent of race-ethnicity, SES, and immigrant status, LM/Limited students scored .48 standard deviations below NE students on the standardized math tests, and .32, .58, and .30 standard deviations below NE students on the math, reading, and general knowledge teacher ratings. Similarly, after social background is controlled LM/Fluent students scored .14, .18, and .45 standard deviations below NE students on the math, reading, and general knowledge standardized assessments, and .19 and .32 standard deviations below NE students on the math and reading teacher ratings. Accounting for social background, no statistically significant differences in general knowledge teacher ratings were detected between LM/Fluent and NE students (Table 10, model 5).

In sum, language-minority students enter kindergarten with significantly lower levels of academic achievement than do their NE counterparts. Social background factors, and in particular race-ethnicity and SES, account for some of these differences but not all of them. Thus, LM/Limited and LM/Fluent students still

have lower standardized assessment scores and teacher ratings than do NE students even after social background differences are taken into account.

Gains in Academic Achievement Over the First Two Years of School

The previous analysis examined academic achievement at kindergarten entry. In addition, a structurally similar set of regression models were estimated to isolate the independent relationships of language-minority status and social background characteristics to gains in academic achievement over the kindergarten and first grade school years. While the previous set of models examined academic achievement in the fall of kindergarten as the dependent variable, these models examine academic achievement in the spring of first grade.[15] Because the intent is to study *academic progress* between the beginning of kindergarten and the end of first grade, all of the models control for academic achievement in the fall of kindergarten. Thus, the effects represent average differences in spring of first grade academic achievement associated with the independent variables, taking into account differences in achievement at kindergarten entry. The models also control for the number of days in between the fall of kindergarten and spring of first grade assessments.

In contrast to the findings on academic achievement at kindergarten entry, language-minority status has a different relationship with gains in academic achievement over kindergarten and first grade. Including only the control variables in the model (1), no statistically significant differences in academic achievement were detected between LM/Limited and NE students. LM/Fluent students, however, made greater gains than did NE students in standardized math (ES = .09 SD) and reading (ES = .11 SD) scores, and teacher ratings of reading ability (ES = .19 SD). Similarly, controlling for teacher rating in the fall of kindergarten, on average LE students scored .10 standard deviations higher than did NE students on the spring of first grade reading teacher rating.

The positive relationships of LM/Fluent status to gains in standardized math scores and reading teacher ratings remain statistically significant even after social background variables are included in the models. Once race-ethnicity, SES, and immigrant status are all controlled (model 5), LM/Fluent students scored .10

[15] A small percentage of students included in the analysis were not in the first grade in 1999-2000. Approximately 4% of students were retained in kindergarten, and just under 1% of students were either in second grade or an ungraded classroom.

standard deviations above NE students on the standardized math test, and .13 standard deviations above NE students on the reading teacher ratings. Statistically significant differences in standardized reading scores between LM/Fluent and NE students, however, are not detected once either the race-ethnicity variables (Table 12, model 2) or immigrant status variables (Table 12, model 4) are controlled.

With respect to teacher ratings in math, no statistically significant differences in achievement are detected between NE students and the other language-minority status groups when either no social background variables are controlled (model 1), or all of the social background variables are controlled (model 5). LM/Fluent and LE students had higher ratings than did NE students once race-ethnicity and SES are controlled, respectively, and LM/Limited students had lower ratings than did NE students once immigrant status is controlled. This is consistent with earlier results, suggesting negative consequences associated with the racial-ethnic and SES makeup of the language-minority population, and positive consequences associated with their immigrant status.

Overall, these results suggest that limited English proficiency has a small negative relationship, if any at all, to gains in academic achievement during kindergarten and first grade. Conversely, in a few areas LM/Fluent and LE students make larger gains in academic achievement than do their NE counterparts. This implies that combined with proficiency in the English language, exposure to non-English languages may increase academic success.

Disentangling the Relationship Between Language-Minority Status, Academic Engagement, and Academic Achievement

This section examines the role of academic engagement in determining academic achievement among language-minority students. The analysis proceeds in two stages. First, a descriptive analysis compares average levels of academic engagement among the various language-minority status groups. In the second stage the academic engagement variables are added to the multivariate models, examining the extent to which they mediate differences in academic achievement among language-minority status groups.

Language-Minority Status and Academic Engagement

Similar to the above analysis, it makes sense to examine the relationship between language-minority status and academic engagement before studying their associations with academic achievement. Thus, the following discussion presents summary statistics which describe the average levels of academic engagement among the various language-minority status groups. These statistics provide a general picture of students' academic engagement, and do not take into account differences in social background that are associated with language-minority status.

The descriptive analysis suggests that language-minority status is not connected to the affective component of academic engagement. No statistically significant differences between language-minority status groups are detected with respect to the school attitude composite variable (checks #21-#26). In contrast, language-minority status is significantly associated with the behavioral or participatory measures of academic engagement. In terms of out-of-school academic activities, language-minority students were less likely to participate than NE students (checks #27-#30). Only 51% of LM/Limited students and 56% of LM/Fluent students read outside of school at least three times per week, compared to 70% of LE students and 68% of NE students.

In terms of in-school behavior, LM/Limited students were significantly less academically engaged than students in the other language-minority status groups, including LM/Fluent students (checks #31-#36). As rated by teachers, only 77% of LM/Limited students worked to the best of their ability, compared to 85% of students in the other three groups. LM/Limited students also scored significantly lower than the other groups on the approaches to learning scale. The size of the difference, however, between LM/Limited and NE students (Cohen's d = .22) is fairly small.[16] Thus, teachers rate LM/Limited students as being less academically engaged than other students, but only by small margins.

Academic Engagement and Academic Achievement

The next step is to examine how academic engagement impacts academic achievement, and mediates differences associated with language-minority status. This analysis focuses on one of the six measures examined above: standardized

[16] See Cohen (1992) for a discussion of effect sizes.

math assessment scores. Because academic engagement is measured here by teacher evaluations of student behaviors, it is not appropriate to estimate the effects of academic engagement on the conceptually similar academic teacher ratings. In terms of the standardized assessments, math is the only subject for which data are available for LM/Limited students. These factors determined the narrow focus.

Two sets of regressions are estimated, one examining academic achievement at kindergarten entry, and the other examining gains in academic achievement over the first two years of school. These models are structurally equivalent to those in the previous section, but include the academic engagement variables.[17] For each set, the model is run with and without the social background variables.

The results (Table 18) show that engagement in academic behaviors has a substantial positive impact on academic achievement, both at kindergarten entry and with respect to gains over kindergarten and first grade. A standard deviation increase in the approaches to learning scale is associated with a .84 standard deviation increase in fall of kindergarten math score, and a .29 standard deviation increase in spring of first grade math score (i.e. controlling for fall of kindergarten math score). Similarly, students who read outside of school at least three times a week scored higher on the fall of kindergarten math assessment, and students who teachers believed worked to the best of their ability made greater math score gains than did other students. These effects decrease some once the social background variables are controlled, but still remain strong and statistically significant. Conversely, attitude towards school (as measured by the school attitude composite variable) did not have a statistically significant effect on achievement.

These effects suggest that language-minority students, and LM/Limited students in particular, stand to have lower levels of academic achievement as a result of lower levels of academic engagement. The results also indicate, however, that academic engagement does not account for low academic achievement among language-minority students.[18] For example, once academic engagement is controlled

[17] The regressions predicting math scores at kindergarten entry do not include the variable indicating whether or not students worked to the best their ability. The data for this variable were collected in the spring of kindergarten, and therefore the variable is not a logical predictor (due to the time order) of math scores in the fall of kindergarten. All of the other academic engagement variables were assessed in the fall of kindergarten.

[18] In fact, once academic engagement is added to the model predicting gains in academic achievement over the first two years of school, the previously statistically insignificant negative effect associated with LM/Limited students reaches statistical significance. Controlling for age, gender, repeating kindergarten, and days between assessments, LM/Limited students only scored .09 standard

the negative effects on math scores at kindergarten entry associated with LM/Limited and LM/Fluent students are similar to the earlier findings (see Table 5).

Summary and Conclusion

This section summarizes the findings of the report, revisiting the research questions that guided the research (presented in the introduction). These research questions can be organized into three general categories: (1) identifying the language-minority student population; (2) language-minority status, social background, and academic achievement; and (3) language-minority status, academic engagement, and academic achievement. The next three parts of this section recap the research questions in each of the three areas, and provide answers to the questions based on the findings in the report. The final part brings the main results together to offer some general conclusions regarding the educational status of language-minority students.

Identifying the Language-Minority Student Population

In order to analyze the academic achievement of language-minority students, it was first necessary to figure out exactly who language-minority students are—such as what defines language-minority status, and what the basic characteristics are of language-minority students. Accordingly, the first set of questions addresses the general identity of the language-minority student population.

What is the size of the kindergarten language-minority student population based on different definitions of language-minority status? The definition of language-minority status used in this report incorporated distinctions based on language use at home, as well as students' level of proficiency in the English language. Language-minority students were defined as those students from home where a non-English language was the primary language spoken. A further distinction was made between English proficient (LM/Fluent) and non-English proficient (LM/Limited) language-minority students. Based on these definitions,

---

deviations below NE students, an effect that is not significant at the $p < .05$ level (Table 11, model 1). Once academic engagement is controlled, however, this effect is .13 standard deviations, and is significant at the $p < .05$ level (Table 18, model 3). The further addition of social background variables, however, reduces the effect to .10 standard deviations, which is not significant at the $p < .05$ level (Table 18, model 4). This suggests that social background accounts for much of the negative LM/Limited effect.

language-minority students represented 12.2% of the 1998-99 kindergarten student population, or 469,274 students. This included 242,788 LM/Limited students (6.3%) and 226,486 LM/Fluent students (5.9%). There were also 354,363 students (9.2%) who had a non-English language spoken at home, though English was still the primary language (language exposure students).

What are the social background characteristics of language-minority students, and how do they compare to those of non-language-minority students? The majority of language-minority students, and an overwhelming majority of LM/Limited students, are Hispanic, have low socioeconomic status, and are children of immigrants. For example, among the LM/Limited students, 84% were Hispanic, 75% had parents with at most a high school diploma, and 83% had mothers who were born outside of the United States. It follows that language-minority students, and LM/Limited students in particular, were more likely than NE students to be Hispanic and have a foreign born mother. Language-minority students also had significantly lower levels of socioeconomic status compared to NE students. These patterns confirm the literature on language-minority students that highlights the close relationship between language-minority status and social background characteristics (i.e. race-ethnicity, SES, and immigrant status).

Language-Minority Status, Social Background, and Academic Achievement

With an established definition and background on language-minority students, it was then possible to analyze the effects of language-minority status on academic achievement. This investigation proceeded in two phases. The first phase concentrated on academic achievement at kindergarten entry; the second phase concentrated on academic progress between the fall of kindergarten and the spring of first grade.

Both theory and evidence from the previous section of the report demonstrate the close relationship between social background characteristics and language-minority status. Thus, in addition to examining the overall relationship of language-minority status to academic achievement, the analysis also examined how this relationship changes once social background characteristics are controlled.

What is the relationship between language-minority status and academic achievement at kindergarten entry? To what extent is this relationship mediated by social background characteristics, and in particular race-ethnicity, SES, and

immigrant status? The results indicate that language-minority students (i.e. LM/Fluent and LM/Limited) begin school with significantly lower levels of academic achievement than do NE students. This pattern held for all subjects (math, reading, and general knowledge), and both standardized assessments and academic teacher ratings. Compared to NE students, LE students also entered kindergarten with lower academic achievement as measured by academic teacher ratings (all subjects) and standardized general knowledge assessments.

Social background factors were also significantly associated with academic achievement at kindergarten entry, and accounted for some of the gaps between language-minority and NE students. Race-ethnicity and SES were both important, implying the relevance of both major theoretical perspectives regarding the education of language-minority students – the sociocultural perspective and the socioeconomic perspective. Even after social background factors were controlled, however, language-minority students still had lower academic achievement at kindergarten entry than did NE students, suggesting the presence of language proficiency effects beyond social background.

What is the relationship between language-minority status and gains in academic achievement over the first two years of school (i.e. kindergarten and first grade)? To what extent is this relationship mediated by social background characteristics, and in particular race-ethnicity, SES, and immigrant status? In contrast to the findings regarding academic achievement at kindergarten entry, language-minority status does not appear to be associated with smaller gains in achievement over the first two years of school. The results suggest that LM/Limited status is associated with small differences in academic achievement gains, if any at all. That is, the achievement gaps between LM/Limited students and NE students at kindergarten entry do not appear to be increasing or decreasing over the first two years of school. For the most part a similar story holds for the LM/Fluent and LE students. Thus, general patterns of academic progress in kindergarten and first grade are not working to close the initial academic achievement gaps between language-minority status groups that are present at school entry.

It should be noted, however, that in a limited number of instances LM/Fluent and LE students actually made greater gains than did NE students. Further, some of these positive relationships (e.g. LM/Fluent status on standardized math score gains) held even after social background was taken into account. Because the language-minority status variable used here does not directly measure proficiency

in multiple languages, this should not be taken as conclusive evidence of positive bilingualism effects. The results do indicate, though, that further research into the educational benefits of bilingualism is both worthwhile, and potentially necessary for understanding differences in academic achievement among language-minority status groups.

Language-Minority Status, Academic Engagement, and Academic Achievement

Given the above patterns of academic achievement among the language-minority status groups, the next step was to try and explain the differences. For this task the research literature suggests that factors related to academic engagement are especially important for language-minority students. Thus, the final stage of the report examined the relationships between language-minority status, academic engagement, and academic achievement.

Based on previous research, academic engagement was broken into two groups: affective and behavioral. Affective engagement was measured by students' expressions of positive and negative attitudes towards school; behavioral engagement was measured by the amount students read outside of school, and teacher ratings of students' academic behaviors in the classroom.

This stage of the analysis proceeded in two stages. The first stage compared the levels of academic engagement among the different language-minority status groups. The second stage examined the relationship of academic engagement to academic achievement, as well as how academic engagement factors are related to differences in academic achievement among language-minority students.

How does academic engagement vary with respect to language-minority status? In terms of affective academic engagement, the results show that language-minority students are not significantly different as compared to NE students. Language-minority students were, however, less likely than NE students to read outside of school. With respect to in-school academic behaviors, the distinction between English proficient and non-English proficient language-minority students is most important: LM/Limited students were significantly less engaged than all other students, including LM/Fluent students.

To what extent does academic engagement relate to differences in academic achievement by language-minority status, both at kindergarten entry and over the first two years of school? While attitudes towards school were not significantly

associated with academic achievement, positive academic behaviors inside and outside of school were associated with greater academic achievement at kindergarten entry, and greater gains in achievement during kindergarten and first grade. These relationships, however, were not crucial for differences in achievement among language-minority status groups. Indeed, the relationship between language-minority status and academic achievement was essentially the same regardless of whether or not academic engagement factors were taken into account.

Conclusions

The results point to three main conclusions about language-minority students in the education system. First, the educational position of language-minority students is oriented towards low levels of educational success. Not only do language-minority students enter kindergarten with lower levels of academic achievement than do other students independent of social background, but they come primarily from racial-ethnic and socioecomic backgrounds (i.e. Hispanic and low-SES) that are associated with low academic achievement. Language-minority students are also less likely to engage in academic behaviors outside of school (measured here by reading) that facilitate higher academic achievement.

Second, the distinction between language-minority students who are proficient in English and those who are not is important. A greater proportion of LM/Limited students than LM/Fluent students are Hispanic, a group associated with low academic achievement, and a greater proportion of LM/Fluent students than LM/Limited students are Asian, a group associated with high academic achievement. LM/Limited students also have lower socioeconomic status than do LM/Fluent students, enter kindergarten with lower levels of academic engagement, and have lower levels of in-school academic engagement. Finally, unlike LM/Fluent students do in a few areas, LM/Limited students do not make greater gains in achievement than NE students over the first two years of school. Thus, language-minority students with limited English proficiency appear to face substantial obstacles that English proficient language-minority students do not.

Third, different levels of academic engagement—measured by a positive orientation towards school, participation in academic activities outside of school, and positive academic behaviors in school—do not account for gaps in achievement between language-minority students and other students. Thus, even after academic engagement is controlled, LM/Limited and LM/Fluent students still enter

kindergarten with lower standardized math scores than NE students. This suggests that explanations for the low academic achievement of language-minority students must go beyond those regarding elements of academic engagement.

References

August, D., & Hakuta, K. (1998). *Educating language-minority children*. Washington, DC: National Academy Press.

Becker, G. (1962). Investment in human capital: A theoretical analysis. *The Journal of Political Economy, 70*, 9-49.

Bourdieu, P. (1977). Cultural reproduction and social reproduction. In J. Karabel & A. H. Halsey (Eds.), *Power and ideology in education* (pp. 487-511). New York: Oxford University Press.

Bourdieu, P. (1984). *Distinction: A Social Critique of the Judgement of Taste* (R. Nice, Trans.). Cambridge, MA: Harvard University Press.

Carbonaro, W. (2005). Tracking, students' effort, and academic achievement. *Sociology of Education*, *78*, 27-49.

Cohen, J. (1992). A power primer. *Psychological Bulletin*, *112*, 155-159.

Cook, P., & Ludwig, J. (1998). The burden of "acting white": Do black adolescents disparage academic achievement. In C. Jencks & M. Phillips (Eds.), *The black-white test score gap* (pp. 375-400). Washington, DC: Brookings Institution Press.

Denton, K., & West, J. (2002). *Children's reading and mathematics achievement in kindergarten and first grade*. Washington, DC: National Center for Education Statistics.

Ensminger, M. E., & Slusarcick, A. L. (1992). Paths to high-school graduation or dropout: A longitudinal study of a 1st-grade cohort. *Sociology of Education*, *65*, 95-113.

Entwisle, D. R., & Alexander, K. L. (1993). Entry into school: The beginning school transition and educational stratification in the United States. *Annual Review of Sociology*, *19*, 401-423.

Farkas, G. (2003). Racial disparities and discrimination in education: What do we know, how do we know it, and what do we need to know? *Teachers College Record*, *105*, 1119-1146.

Ferguson, R. F. (1998). Teachers' perceptions and expectations and the black-white test score gap. In C. Jencks & M. Phillips (Eds.), *The black-white test score gap* (pp. 273-317). Washington, DC: Brookings Institution.

Gordon, M. (1964). *Assimilation in American life: The role of race, religion, and national origins*. Oxford: Oxford University Press.

Hauser, R. M., Tsai, S. L., & Sewell, W. H. (1983). A model of stratification with response error in social and psychological variables. *Sociology of Education*, *56*, 20-46.

Jencks, C., & Phillips, M. (1998). *The black-white test score gap*. Washington, DC: Brookings Institution Press.

Johnson, M. K., Crosnoe, R., & Elder, G. H. (2001). Students' attachment and academic engagement: The role of race and ethnicity. *Sociology of Education*, *74*, 318-340.

Kao, G., & Thompson, J. S. (2003). racial and ethnic stratification in educational achievement and attainment. *Annual Review of Sociology*, *29*, 417-442.

Lareau, A. (1987). Social-class differences in family-school relationships: The importance of cultural capital. *Sociology of Education*, *60*, 73-85.

Lareau, A. (2003). *Unequal childhoods: Class, race, and family life*. Berkeley: University of California Press.

Lee, V., & Burkam, D. (2002). *Inequality at the starting gate: Social background differences in achievement as children begin school*. Washington, DC: Economic Policy Institute.

Nakao, K., & Treas, J. (1992). Computing the 1989 socioeconomic index. *General social survey methodological reports no. 74*. Chicago: National Opinion Research Center.

National Center for Education Statistics (NCES). (2001). *User's manual for the ECLS-K base year public use data files and electronic codebook*. Washington, DC: Author.

National Center for Education Statistics (NCES). (2002). *User's manual for the ECLS-K first grade public use data files and electronic codebook*. Washington, DC: Author.

Ogbu, J. (1978). *Minority education and caste: The American system in cross-cultural perspective*. New York: Academic Press.

Ogbu, J. (1992). Understanding cultural diversity and learning. *Educational Researcher*, *21*, 5-14.

Ogbu, J. (2003). *Black American students in an affluent suburb: A study of academic disengagement*. Mahwah, NJ: Lawrence Erlbaum Associates.

Ogbu, J., & Matute-Bianchi, M. E. (1986). Understanding sociocultural factors: Knowledge, identity, and school adjustment. In Bilingual Education Office,

California State Department of Education (Eds.), *Beyond language: Social and cultural factors in schooling language-minority students*. Los Angeles: Evaluation, Dissemination, and Assessment Center, California State University, Los Angeles.

Portes, A., & Hao, L. (1998). E pluribus unum: Bilingualism and loss of language in the second generation. *Sociology of Education*, *71*, 269-294.

Portes, A., & Rumbaut, R. (1990). *Immigrant America: A Portrait*. Berkeley: University of California Press.

Portes, A., & Zhou, M. (1993). The new second generation: Segmented assimilation and its variants among post-1965 immigrant youth. *Annals of the American Academy of Political and Social Science*, *530*, 74-96.

Rumberger, R. W., & Larson, K. A. (1998). Toward explaining differences in educational achievement among Mexican American language-minority students. *Sociology of Education*, *71*, 68-92.

Schmid, C. L. (2001). Educational achievement, language-minority students, and the new second generation. *Sociology of Education*, *74*, 71-87.

Sewell, W. H., & Hauser, R. M. (1980). The Wisconsin longitudinal study of social and psychological factors in aspirations and achievement. *Research in Sociology of Education and Socialization*, *1*, pp. 59-99.

Smith, J. P., & Edmonston, B. (1997). *The new Americans: Economic, demographic, and fiscal effects of immigration*. Washington, DC: National Academy Press.

Warren, J. R. (1996). Educational inequality among white and Mexican-origin adolescents in the American southwest: 1990. *Sociology of Education*, 69, 142-158.

Zhou, M. (1997). Growing up American: The challenge confronting immigrant children and children of immigrants. *Annual Review of Sociology*, 23, 63-95.

Appendix A

Methodology and Technical Notes

Survey Methodology and Sample Design

The Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) began in the fall of the 1998-99 school year. The students participating in the ECLS-K were followed longitudinally from kindergarten through the fifth grade. In the Base Year (kindergarten), students were selected using a dual-frame, multistage sample design. First, geographic areas such as counties and county groups—primary sampling units (PSUs)—were selected from a national frame. Second, public and private schools were selected from within these PSUs, and children were sampled within the schools. Approximately 23 students were selected in each of the schools. Through this process a nationally representative sample of 22,782 students from 1,277 schools was selected for the study.

The estimates in this report are based on the sample of students who participated in the study in both the fall and spring of 1998 when students were in kindergarten, and the spring of 1999 when most students were in first grade. This sample includes 13,983 students. Unless otherwise noted, the figures in the report are weighted estimates based on this sample. The samples used in the regression analyses are slightly smaller because cases were excluded due to missing data on the dependent variables. The implications of these restrictions for the generalizability of the results are discussed in the body of the report.

Sample Weights and Standard Errors

In order for the results to be representative of the national population it was necessary to weight the sample data. Weighting is done to account for two factors: unequal probabilities of selection among the sampled students, and nonresponse to survey instruments. All of the estimates in this report were obtained using the Y2COMW0 child panel weight. This weight is based on the inverse of students' probability of selection, and accounts for missing data due to sample attrition and nonresponse to entire instruments (e.g. parent survey, teacher survey, administrator survey). More details about the development of the weights for the ECLS-K are provided in the ECLS-K User's Manuals (NCES, 2001; 2002).

Due to the complex nature of the sample design, in addition to using weights it was also necessary to take special steps for computing variances associated with the estimates. The stratified probability sampling used in the ECLS-K results in data that violate the assumptions normally associated with simple random samples. The standard errors in complex samples are often larger than would be expected for a

simple random sample, and could therefore bias the reporting of statistical significance levels. To account for this bias the estimates in this report were obtained using special procedures for producing standard errors. In particular, Taylor series approximation methods were used to estimate variances around the estimates. Means and percentages were obtained using AM Version 0.06.02 Beta software, and regression estimates were obtained using the "svyregress" procedure in Intercooled STATA 8.1 for Windows. These procedures used the appropriate variables for identifying the sample strata (Y2COMSTR) and primary sampling units (Y2COMPSU).

Statistical Procedures

This report uses two types of statistical procedures for making comparisons between students. The first is by comparing means and percentage for students in different categorical groups (e.g. language-minority status groups). When comparing estimates for two different categorical groups, *t* statistics were calculated to determine levels of statistical significance. The following formula was used to calculate *t* statistics:

$$t = \frac{\text{Estimate}_1 - \text{Estimate}_2}{\text{SQRT}[(\text{Standard error}_1)^2 + (\text{Standard error}_2)^2]}$$

Where Estimate_1 and Estimate_2 are the estimates being compared, and Standard error_1 and Standard error_2 are their corresponding standard errors. It should be noted that this formula is only appropriate for comparing independent estimates. Based on this formula, statistical significance depends on both the size of the difference and sample size (i.e. as reflected in the standard errors). Due to the large sample size of the ECLS-K, even small differences may be statistically significant. Thus, it is necessary to have a rule for determining whether or not differences are of substantive importance. For the purposes of this report, estimates are considered to be substantively different if the difference is at least five percentage points for bivariate comparisons, and .20 standard deviations according to Cohen's d (Cohen, 1992) for mean differences.

The second procedure used to make comparisons is ordinary least squares (OLS) regression. This procedure was used to describe the relationship of key

variables (e.g. language-minority status) to academic achievement while controlling for other variables (e.g. social background). The independent variables were entered simultaneously in all of the regression models. As with the descriptive comparisons, *t* statistics were computed to determine levels of statistical significance. The same formula as given above was used for these calculations, using the unstandardized regression coefficients and their standard errors for $Estimate_1$, and setting $Estimate_2$ and its standard error to zero. The significance levels therefore reflect the statistical difference between the estimated coefficient and zero.

To provide a more accurate reflection of the magnitude of the relationships between variables, the unstandardized regression coefficients were converted into standard deviation (SD) units, or effect size units. This is the metric used in the tables, and throughout the report. The standard deviation for each of the dependent variables used in the report is provided in Table 20. Based on these estimates, SD units were calculated by dividing the unstandardized regression coefficients by the appropriate standard deviation. For example, the standard deviation for the fall of kindergarten standardized math score is 7.144. Thus, the unstandardized coefficient of -6.337 for LM/Limited students in Table 5, model 1, is transformed into the reported estimate by the following calculation: -6.337/7.144 = -0.887. Only coefficients reflecting substantively important difference are discussed in the text. For the purposes of this report, coefficients are defined as substantively important if the absolute value is at least .05 standard deviation units.

It should be noted that in addition to the variables reported in the tables, binary dummy variables indicating the presence of missing values were also included in the regression models. So as to preserve the sample sizes and not eliminate cases, data were imputed for missing values on the independent variables, and their corresponding imputation flags were included as independent variables in the models. When there were missing values on the categorical independent variables—language-minority status, parental education, immigrant status (child and mother foreign born), student reading outside of school, works to the best of ability, and repeating kindergarten—the actual variable was set to zero, and imputation flag was set to one. When there were missing values on the continuous independent variables—age, parental occupational status, days in between assessments, school attitude composite, and the approaches to learning scale—the actual variable was set to the mean, and the imputation flag was set to one. Missing data flags were not needed for the annual household income variable or the sex variable (male).

Academic Achievement Measures

This report uses two different types of variables to measure students' academic achievement in the fall of kindergarten and spring of first grade. The first set of variables includes student scores on direct cognitive assessments in math, reading, and general knowledge. The assessments were untimed, one-on-one, and conducted by trained NCES officials. The math assessments were designed to measure conceptual knowledge, procedural knowledge, and problem solving. Approximately half of the math questions were on number sense and number properties, and the remaining questions addressed a variety of topics including geometry, probability, algebra, and functions. The reading assessments were designed to measure basic skills such as letter recognition and sounds, vocabulary, and comprehension. The general knowledge assessments included questions on both science and social studies. The science questions covered students' conceptual understanding of scientific facts, as well as their ability to handle questions about the natural world; the social studies questions covered topics including geography, history, government, culture, and economics. The same sets of questions were used in the fall of kindergarten and spring of first grade, allowing for an analysis of progress over time.

Each of the assessments was developed to consist of two-stages. All students were administered the first stage routing test, which included questions of various difficulties. Based on the number of questions answered correctly in this first stage, students were then "routed" into a second-stage appropriate for their ability level. Thus, all students received the same first stage test, but only groups of students received the same second-stage test. Item Response Theory (IRT) techniques were then used to calibrate scores from the different tests on a common scale. The resulting IRT scores, which were the measures used in this report, reflect the number of items each students would have answered correctly were they to have taken the entire test. Thus, it is valid to compare IRT scores for students who were administered different second-stage tests.

All students who were identified as native English speakers were administered the assessments in English. Students whose home language was not English were first given a language screener to determine their English language proficiency. If students passed the language screener as English proficient, they were then administered all three (math, reading, general knowledge) of the cognitive assessments. If students were determined not to be English proficient, but were

identified as Spanish-speaking, they were then administered a Spanish language screener. Students who were determined to be Spanish proficient were administered the math assessment, but not the reading and general knowledge assessments, as a Spanish version was only developed for math. Additional analyses show that the language used for the assessment did not have an effect on student performance (NCES, 2001; 2002). Students who were not proficient in English or Spanish were excluded from all of the cognitive assessments.

The second set of measures of academic achievement includes teacher ratings of academic ability. These measures are based on Academic Rating Scales (ARS) developed from teacher responses to survey items. In both the fall of kindergarten and the spring of first grade, teachers were asked to rate students' ability on a variety of math, reading, and general knowledge skills. The math items covered proficiency in number concepts, solving number problems, using math strategies, graphing, and measurement. The reading items covered proficiency in speaking, listening, early reading, writing, and computer literacy. The general knowledge items addressed students' proficiency in science and social studies. Teacher ratings were completed for all students, regardless of their language background.

The entire battery included 20 questions about students' academic ability. For each skill, teachers were asked to rate students on a five level scale ranging from not yet demonstrating the skill to competent and consistent demonstration of the skill. Teachers were also allowed to indicate that they had not yet introduced the skill into the classroom setting. Item Response Theory (IRT) and Rasch Rating Scale techniques were then used to compile these responses into Academic Rating Scales ranging from one to five. The ARS scores for math, reading, and general knowledge were used as dependent variables in this report.

Unlike the direct cognitive assessments, teachers were asked to report on different (grade-appropriate) skills in the fall of kindergarten and the spring of first grade. Thus, while it makes sense to assess the general relationship between ARS scores at different periods of time, it is not appropriate to calculate ARS gains over time. While the ARS was designed to overlap with the direct cognitive assessments, it also complements them in two important ways. First, whereas the direct cognitive assessments focus exclusively on students' level of achievement, the ARS also addresses processes of learning. Second, because the ARS did not have to adhere to the standardized testing format, it includes a wider range of skills that make up

current national curricula and guidelines. Thus, the ARS is an important addition to the set of academic achievement measures.

Appendix B

Tables

Table 1
Percentage of Fall 1998 Kindergartners with Selected Baseline Characteristics, by Sample

Selected characteristics	Full sample	Multivariate analysis samples		
		Direct cognitive assessments		
		Math	Reading	General knowledge
Language minority status				
Language exposure	9.2	9.4	9.9	10.0
LM/Fluent	5.9	5.9	6.3	6.2
LM/Limited	6.3	5.3	0.0	0.0
Student characteristics				
Race-ethnicity				
Black/African-American	16.1	16.3	17.3	17.2
Hispanic	18.7	18.8	13.8	13.7
Mexican	10.2	10.3	6.4	6.4
Other Hispanic	4.1	4.1	3.4	3.4
Detailed category missing	4.4	4.4	4.0	3.9
Asian/Pacific Islander	3.5	2.7	2.8	2.8
Chinese, Japanese, Korean, Asian Indian	0.9	0.7	0.8	0.8
Other Asian/Pacific Islander	1.6	1.3	1.3	1.3
Detailed category missing	0.9	0.6	0.7	0.7
Other race	3.9	3.9	4.2	4.1
Native American or Alaskan native	1.7	1.7	1.8	1.8
Multiracial	2.2	2.2	2.4	2.3
Missing data	0.2	0.2	0.2	0.2
Socioeconomic status				
Parental education				
High school or less	38.4	38.3	35.5	35.5
Bachelor's degree or higher	28.7	28.8	30.2	30.3
Annual household income ($1000s) (average)	50.2	50.4	52.3	52.4
Parental occupational status (average)	44.7	44.7	45.1	45.2
Immigrant status				
Child is foreign born	2.6	2.3	1.6	1.6
Parent is foreign born	14.8	14.0	9.7	9.7
Total N	13,983	13,686	12,996	12,962
Sum of weights	3,842,961	3,773,750	3,555,549	3,538,413

Table 1 Continued

Selected characteristics	Multivariate analysis samples		
	Teacher academic ratings		
	Math	Reading	General knowledge
Language minority status			
Language exposure	9.5	9.4	9.4
LM/Fluent	6.4	6.0	6.3
LM/Limited	5.9	6.0	5.9
Student characteristics			
Race-ethnicity			
Black/African-American	15.5	15.7	16.1
Hispanic	19.1	18.4	18.7
Mexican	10.3	9.9	10.0
Other Hispanic	4.1	3.8	3.9
Detailed category missing	4.7	4.7	4.7
Asian/Pacific Islander	3.5	3.7	3.7
Chinese, Japanese, Korean, Asian Indian	1.0	1.0	1.0
Other Asian/Pacific Islander	1.5	1.7	1.8
Detailed category missing	1.0	1.0	0.9
Other race	3.6	3.7	3.8
Native American or Alaskan native	1.7	1.6	1.6
Multiracial	2.0	2.1	2.2
Missing data	0.2	0.2	0.1
Socioeconomic status			
Parental education			
High school or less	37.8	37.5	37.5
Bachelor's degree or higher	28.7	29.2	29.3
Annual household income ($1000s) (average)	50.0	50.7	50.5
Parental occupational status (average)	44.6	44.7	44.7
Immigrant status			
Child is foreign born	2.6	2.6	2.6
Parent is foreign born	14.5	14.3	14.4
Total N	9,298	11,605	9,559
Sum of weights	2,416,607	2,980,705	2,444,905

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Table 2

Percentage and Number of Fall 1998 Kindergartners in Selected Language Minority Populations

Language minority status	Percentage	Number
Panel A. Evaluating populations separately		
Home language		
English is the only language spoken at home	78.1	3,000,961
Non-English language spoken at home, non-primary	9.5	365,534
Non-English language spoken at home, primary	12.3	472,013
Missing	0.1	4,453
English proficiency exam		
Did not take exam	87.0	3,342,989
Took exam and passed	5.7	220,514
Took exam and failed	7.0	267,421
Missing	0.3	12,036
Panel B. Overlapping populations		
English is the only language spoken at home		
Did not take exam	76.9	2,953,681
Took exam and passed	0.7	25,892
Took exam and failed	0.3	12,946
Missing	0.2	8,442
Non-English language spoken at home, non-primary		
Did not take exam	7.7	295,017
Took exam and passed	1.5	58,728
Took exam and failed	0.3	11,170
Missing	0.0	618
Non-English language spoken at home, primary		
Did not take exam	2.4	90,950
Took exam and passed	3.5	135,536
Took exam and failed	6.3	242,788
Missing	0.1	2,738
Home language missing		
Did not take exam	0.1	3,341
Took exam and passed	0.0	358
Took exam and failed	0.0	516
Missing	0.0	238

Table 2 Continued

Language minority status	Percentage	Number
Panel C. Composite variable		
Native English	77.80	2,988,015
Language exposure	9.22	354,363
LM/Fluent	5.89	226,486
LM/Limited	6.32	242,788
Language minority status missing	0.81	31,308

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Table 3

Selected Features of Academic Achievement Measures

Feature	Academic achievement measure	
	Standardized cognitive assessments	Teacher academic ratings
Content consistency	Same skills are evaluated in kindergarten and first grade	Different skills are measured in kindergarten and first grade
Evaluation of language-minority students	English proficient and Spanish proficient students are evaluated in math, and only English proficient students are evaluated in reading and general knowledge	All students are evaluated in all three subjects
Exclusion of additional students	None	Students who did not successfully transition to the first grade are not evaluated in any subject during the first grade school year
Evaluator consistency	Evaluation is completed by project fieldworkers in kindergarten and first grade	Ratings are completed by different teachers in kindergarten and first grade
Evaluator positioning	Project fieldworker (objective)	Student's teacher (less objective)
Subjects evaluated	Math, reading, and general knowledge	Math, reading, and general knowledge
Interpretation/meaning	Cognitive ability	Academic standing

Table 4

Percentage of Fall 1998 Kindergartners with Selected Characteristics, by Language Minority Status

Selected characteristics	Language minority status			
	NE	Language exposure	LM/Fluent	LM/Limited
Race-ethnicity				
Black/African-American	19.6	7.0	2.8	0.0
Hispanic	5.8	48.3	65.5	84.2
Mexican/Mexican-American	2.5	22.4	32.9	63.0
Other Hispanic	1.1	12.0	20.9	12.0
Detailed category missing	2.2	14.0	11.7	9.1
Asian/Pacific Islander	1.0	8.1	17.9	12.1
Chinese, Japanese, Korean, Asian Indian	0.2	2.2	6.5	2.6
Other Asian/Pacific Islander	0.6	3.9	7.6	5.4
Detailed category missing	0.3	2.0	3.8	4.1
Native American or Alaskan native	1.5	5.4	0.8	0.1
Multiracial	2.5	2.6	0.5	0.0
Missing data	0.2	0.1	0.2	0.1
Socioeconomic status				
Parental education				
High school or less	34.4	34.8	52.8	75.4
Bachelor's degree or higher	30.7	29.0	25.9	9.3
Annual household income (average)	53.5	51.8	37.0	21.9
Parental occupational status (average)	45.4	45.2	42.2	38.5
Immigrant status				
Child is foreign born	0.9	2.4	10.4	16.2
Mother is foreign born	3.5	25.1	68.3	82.8
Control variables				
Male	51.5	51.4	51.8	52.0
Age in fall of kindergarten (average)	5.7	5.7	5.7	5.6
Repeating kindergarten in 1998-1999	4.3	2.6	5.0	4.1

Table 4 Continued

Selected characteristics	Language minority status			
	NE	Language exposure	LM/Fluent	LM/Limited
Days between assessments (average)	554.6	556.4	556.2	560.2
Total N	10,655	1,389	976	838
Sum of weights	2,988,015	354,363	226,486	242,788

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Table 5

Estimated Effects of Language Minority Status and Selected Variables on Fall of Kindergarten Standardized Assessment Math Score for Fall 1998 Kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited	-0.887**	-0.625**	-0.521**	-0.968**	-0.477**
LM/Fluent	-0.250**	-0.152**	-0.132**	-0.295**	-0.137**
Language exposure	-0.114	0.000	-0.099*	-0.122*	-0.054
Race-ethnicity					
Black, non-Hispanic		-0.586**			-0.300**
Hispanic		-0.426**			-0.213**
Asian/Pacific Islander		0.197*			0.130*
Other race		-0.485**			-0.311**
Socioeconomic status					
Parental education					
High school or less			-0.244**		-0.224**
Bachelor's degree or higher			0.344**		0.312**
Annual household income ($1000s)			0.003**		0.002**
Parental occupational status			0.009**		0.008**
Immigrant status					
Child is foreign born				0.083	-0.066
Parent is foreign born				0.086	0.066
Controls					
Age in fall of kindergarten	0.723**	0.689**	0.725**	0.728**	0.712**
Male	-0.012	-0.010	-0.002	-0.012	-0.003
Repeating kindergarten in 1998-1999	-0.224**	-0.179*	-0.159*	-0.207**	-0.140*
Number of Cases	13,686	13,686	13,686	13,686	13,686
R Squared	.12	.18	.29	.13	.30

** p<0.01; * p<0.05 two tailed

Table 6

Estimated effects of language minority status and selected variables on fall of kindergarten standardized assessment reading score for fall 1998 kindergartners

	Estimated effects in standard deviation units				
Variable	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited					
LM/Fluent	-0.266**	-0.177**	-0.160**	-0.355**	-0.175**
Language exposure	-0.070	0.041	-0.056	-0.091	-0.014
Race-ethnicity					
Black, non-Hispanic		-0.390**			-0.108**
Hispanic		-0.381**			-0.170**
Asian/Pacific Islander		0.288**			0.216**
Other race		-0.452**			-0.281**
Socioeconomic status					
Parental education					
High school or less			-0.240**		-0.228**
Bachelor's degree or higher			0.346**		0.319**
Annual household income ($1000s)			0.002**		0.002**
Parental occupational status			0.009**		0.008**
Immigrant status					
Child is foreign born				0.176*	-0.019
Parent is foreign born				0.138**	0.076
Controls					
Age in fall of kindergarten	0.511**	0.487**	0.513**	0.516**	0.511**
Male	-0.170**	-0.168**	-0.162**	-0.170**	-0.161**
Repeating kindergarten in 1998-99	-0.011	0.024	0.057	0.005	0.068
Number of Cases	12,996	12,996	12,996	12,996	12,996
R Squared	0.05	0.09	0.2	0.06	0.21

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 7

Estimated effects of language minority status and selected variables on fall of kindergarten standardized assessment general knowledge score for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited					
LM/Fluent	-0.686**	-0.550**	-0.560**	-0.595**	-0.446**
Language exposure	-0.234**	-0.110*	-0.219**	-0.192**	-0.135**
Race-ethnicity					
Black, non-Hispanic		-0.918**			-0.626**
Hispanic		-0.457**			-0.238**
Asian/Pacific Islander		-0.309**			-0.327**
Other race		-0.548**			-0.373**
Socioeconomic status					
Parental education					
High school or less			-0.305**		-0.273**
Bachelor's degree or higher			0.334**		0.300**
Annual household income ($1000s)			0.003**		0.002**
Parental occupational status			0.009**		0.007**
Immigrant status					
Child is foreign born				0.096	-0.086
Parent is foreign born				-0.120**	-0.078*
Controls					
Age in fall of kindergarten	0.805**	0.739**	0.808**	0.806**	0.761**
Male	0.014	0.016	0.023	0.015	0.023
Repeating kindergarten in 1998-99	-0.281**	-0.210**	-0.205**	-0.251**	-0.162**
Number of Cases	12,962	12,962	12,962	12,962	12,962
R Squared	0.12	0.24	0.31	0.14	0.36

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 8

Estimated effects of language minority status and selected variables on fall of kindergarten teacher rating in math for fall 1998 kindergartners

	Estimated effects in standard deviation units				
Variable	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited	-0.619**	-0.453**	-0.374**	-0.639**	-0.323**
LM/Fluent	-0.331**	-0.205*	-0.233**	-0.340**	-0.191*
Language exposure	-0.512*	-0.035	-0.126*	-0.149*	-0.068
Race-ethnicity					
Black, non-Hispanic		-0.411**			-0.210**
Hispanic		-0.345**			-0.179*
Asian/Pacific Islander		-0.004			-0.039
Other race		-0.413**			-0.290**
Socioeconomic status					
Parental education					
High school or less			-0.213**		-0.199**
Bachelor's degree or higher			0.202**		0.181**
Annual household income ($1000s)			0.002**		0.001**
Parental occupational status			0.007**		0.007**
Immigrant status					
Child is foreign born				0.007	-0.091
Parent is foreign born				0.032	0.042
Controls					
Age in fall of kindergarten	0.514**	0.478**	0.503**	0.516**	0.488**
Male	-0.144**	-0.142**	-0.139**	-0.139**	-0.138**
Repeating kindergarten in 1998-99	-0.087	-0.045	-0.025	-0.077	-0.005
Number of Cases	9,298	9,298	9,298	9,298	9,298
R Squared	0.08	0.11	0.17	0.08	0.18

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 9

Estimated effects of language minority status and selected variables on fall of kindergarten teacher rating in reading for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited	-0.890**	-0.713**	-0.651**	-0.907**	-0.583**
LM/Fluent	-0.460**	-0.326**	-0.372**	-0.468**	-0.315**
Language exposure	-0.162**	-0.043**	-0.151**	-0.159*	-0.086*
Race-ethnicity					
Black, non-Hispanic		-0.344**			-0.122**
Hispanic		-0.336**			-0.160*
Asian/Pacific Islander		-0.050			-0.076
Other race		-0.421**			-0.293**
Socioeconomic status					
Parental education					
High school or less			-0.204**		-0.196**
Bachelor's degree or higher			0.240**		0.227**
Annual household income ($1000s)			0.001**		0.001**
Parental occupational status			0.007**		0.007**
Immigrant status					
Child is foreign born				0.033	-0.058
Parent is foreign born				0.028	0.033
Controls					
Age in fall of kindergarten	0.472**	0.442**	0.474**	0.475**	0.464**
Male	-0.210**	-0.211**	-0.211**	-0.209**	-0.213**
Repeating kindergarten in 1998-1999	-0.037	-0.001	0.014	-0.030	0.028
Number of Cases	11,605	11,605	11,605	11,605	11,605
R Squared	0.11	0.14	0.21	0.11	0.21

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 10

Estimated effects of language minority status and selected variables on fall of kindergarten teacher rating in general knowledge for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited	-0.669**	-0.469**	-0.444**	-0.617**	-0.300**
LM/Fluent	-0.338**	-0.182*	-0.257**	-0.290**	-0.135
Language exposure	-0.177*	-0.040	-0.161**	-0.153*	-0.069
Race-ethnicity					
Black, non-Hispanic		-0.374**			-0.168**
Hispanic		-0.363**			-0.189*
Asian/Pacific Islander		-0.141			-0.148
Other race		-0.410**			-0.294**
Socioeconomic status					
Parental education					
High school or less			-0.169**		-0.158**
Bachelor's degree or higher			0.235**		0.221**
Annual household income ($1000s)			0.002**		0.002**
Parental occupational status			0.008**		0.008**
Immigrant status					
Child is foreign born				-0.017	-0.118
Parent is foreign born				-0.055	-0.032
Controls					
Age in fall of kindergarten	0.448**	0.413**	0.441**	0.448**	0.426**
Male	-0.123**	-0.124**	-0.118**	-0.123**	-0.122**
Repeating kindergarten in 1998-1999	-0.066	-0.018	0.002	-0.059	0.023
Number of Cases	9,559	9,559	9,559	9,559	9,559
R Squared	0.07	0.10	0.16	0.08	0.17

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 11

Estimated effects of language minority status and selected variables on spring of first grade standardized assessment math score for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited	-0.085	-0.098	-0.024	-0.084	-0.085
LM/Fluent	0.089*	0.103*	0.112**	0.095*	0.097*
Language exposure	-0.009	0.004	-0.012	-0.004	-0.099
Race-ethnicity					
Black, non-Hispanic		-0.308**			-0.261**
Hispanic		-0.087*			-0.054
Asian/Pacific Islander		-0.178**			-0.193**
Other race		-0.141**			-0.117*
Socioeconomic status					
Parental education					
High school or less			-0.122**		-0.114**
Bachelor's degree or higher			0.038		0.034
Annual household income ($1000s)			0.000**		0.000
Parental occupational status			0.002*		0.001
Immigrant status					
Child is foreign born				0.083	0.052
Parent is foreign born				-0.017	0.020
Controls					
Age in fall of kindergarten	0.055	0.054	0.089**	0.055	0.079**
Male	0.024	0.025	0.025	0.024	0.026
Repeating kindergarten in 1998-1999	-0.309**	-0.295**	-0.299**	-0.306**	-0.291**
Days between assessments	0.004**	0.004**	0.004**	0.004**	0.004**
Fall of kindergarten score	0.097**	0.093**	0.090**	0.096**	0.088**
Number of Cases	13,686	13,686	13,686	13,686	13,686
R Squared	.49	.50	.50	.49	.51

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 12

Estimated effects of language minority status and selected variables on spring of first grade standardized assessment reading score for fall 1998 kindergartners

	Estimated effects in standard deviation units				
Variable	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited					
LM/Fluent	0.108**	0.047	0.132**	0.055	0.010
Language exposure	-0.014	-0.040	-0.065	-0.029	-0.065*
Race-ethnicity					
Black, non-Hispanic		-0.236**			-0.167**
Hispanic		-0.001			0.039
Asian/Pacific Islander		0.046			0.018
Other race		-0.200**			-0.165*
Socioeconomic status					
Parental education					
High school or less			-0.123**		-0.118**
Bachelor's degree or higher			0.051		0.047
Annual household income ($1000s)			0.001**		0.001**
Parental occupational status			0.002		0.001
Immigrant status					
Child is foreign born				0.035	-0.010
Parent is foreign born				0.081	0.085
Controls					
Age in fall of kindergarten	0.068*	0.063	0.095**	0.073*	0.091**
Male	-0.110**	-0.111**	-0.117**	-0.111**	-0.118**
Repeating kindergarten in 1998-1999	-0.522**	-0.508**	-0.498**	-0.520**	-0.494**
Days between assessments	0.003**	0.003**	0.003**	0.003**	0.003**
Fall of kindergarten score	0.075**	0.074**	0.070**	0.075**	0.069**
Number of Cases	12,996	12,996	12,996	12,996	12,996
R Squared	.44	.45	.45	.44	.46

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 13

Estimated effects of language minority status and selected variables on spring of first grade standardized assessment general knowledge score for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited					
LM/Fluent	0.025	0.048	0.024	-0.002	0.016
Language exposure	-0.005	0.026	-0.015	-0.010	0.002
Race-ethnicity					
Black, non-Hispanic		-0.277**			-0.240**
Hispanic		-0.155**			-0.121**
Asian/Pacific Islander		-0.078			-0.115**
Other race		-0.085			-0.062
Socioeconomic status					
Parental education					
High school or less			-0.159**		-0.153**
Bachelor's degree or higher			0.042*		0.036
Annual household income ($1000s)			0.000*		0.000
Parental occupational status			0.002*		0.001
Immigrant status					
Child is foreign born				0.106	0.054
Parent is foreign born				0.029	0.040
Controls					
Age in fall of kindergarten	-0.025	-0.011	0.020	-0.021	0.026
Male	0.070**	0.072**	0.072**	0.071**	0.073**
Repeating kindergarten in 1998-1999	-0.164**	-0.155**	-0.156**	-0.159**	-0.148**
Days between assessments	0.002**	0.002**	0.002**	0.002**	0.002**
Fall of kindergarten score	0.106**	0.101**	0.099	0.106**	0.095**
Number of Cases	12,962	12,962	12,962	12,962	12,962
R Squared	.62	.63	.63	.62	.64

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 14

Estimated effects of language minority status and selected variables on spring of first grade teaching rating in math for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited	-0.130	-0.089	-0.009	-0.185*	-0.068
LM/Fluent	0.084	0.117	0.128*	0.043	0.084
Language exposure	0.066	0.105*	0.074	0.060	0.076
Race-ethnicity					
Black, non-Hispanic		-0.301**			-0.202**
Hispanic		-0.155**			-0.074
Asian/Pacific Islander		-0.033			-0.080**
Other race		-0.231**			-0.177**
Socioeconomic status					
Parental education					
High school or less			-0.203**		-0.195**
Bachelor's degree or higher			0.106**		0.097**
Annual household income ($1000s)			0.001**		0.001*
Parental occupational status			0.004**		0.004**
Immigrant status					
Child is foreign born				0.056	-0.007
Parent is foreign born				0.062	0.078
Controls					
Age in fall of kindergarten	0.213**	0.200**	0.236**	0.215	0.228
Male	-0.001	-0.003	-0.007	-0.001	-0.009
Repeating kindergarten in 1998-99	-0.497**	-0.472**	-0.458**	-0.497**	-0.450**
Days between assessments	0.003**	0.003**	0.003**	0.003**	0.003**
Fall of kindergarten rating	0.450**	0.424**	0.374**	0.447**	0.365**
Number of Cases	9,298	9,298	9,298	9,298	9,298
R Squared	.16	.17	.19	.16	.20

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 15

Estimated effects of language minority status and selected variables on spring of first grade teaching rating in reading for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited	0.024	0.001	0.095	-0.030	-0.005
LM/Fluent	0.193**	0.174**	0.215**	0.151**	0.133*
Language exposure	0.104**	0.102**	0.100**	0.093*	0.070
Race-ethnicity					
Black, non-Hispanic		-0.205**			-0.123
Hispanic		-0.050			0.012
Asian/Pacific Islander		0.025			-0.005
Other race		-0.152**			-0.117*
Socioeconomic status					
Parental education					
High school or less			-0.143**		-0.140**
Bachelor's degree or higher			0.081**		0.078**
Annual household income ($1000s)			0.000		0.000
Parental occupational status			0.004**		0.004**
Immigrant status					
Child is foreign born				0.018	-0.023
Parent is foreign born				0.069	0.073
Controls					
Age in fall of kindergarten	0.086*	0.079	0.109**	0.088*	0.106**
Male	-0.139**	-0.141**	-0.151**	-0.139**	-0.152**
Repeating kindergarten in 1998-1999	-0.547**	-0.532**	-0.521**	-0.546**	-0.515**
Days between assessments	0.003**	0.003**	0.003**	0.003**	0.003**
Fall of kindergarten rating	0.650**	0.634**	0.581**	0.648**	0.577**
Number of Cases	11,605	11,605	11,605	11,605	11,605
R Squared	.25	.25	.27	.25	.27

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 16

Estimated effects of language minority status and selected variables on spring of first grade teaching rating in general knowledge for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units				
	(1)	(2)	(3)	(4)	(5)
Language minority status					
LM/Limited	-0.135	-0.069	-0.019	-0.192*	-0.066
LM/Fluent	0.041	0.096	0.080	-0.008	0.045
Language exposure	0.059	0.111*	0.058	0.048	0.064
Race-ethnicity					
Black, non-Hispanic		-0.293**			-0.190**
Hispanic		-0.174*			-0.087
Asian/Pacific Islander		-0.114			-0.150*
Other race		-0.189**			-0.140*
Socioeconomic status					
Parental education					
High school or less			-0.183**		-0.175**
Bachelor's degree or higher			0.090**		0.083*
Annual household income ($1000s)			0.001**		0.001*
Parental occupational status			0.006**		0.006**
Immigrant status					
Child is foreign born				0.004	-0.059
Parent is foreign born				0.078	0.103*
Controls					
Age in fall of kindergarten	0.198**	0.184**	0.219**	0.201	0.209**
Male	-0.032	-0.034	-0.037	-0.031	-0.038
Repeating kindergarten in 1998-1999	-0.488**	-0.458**	-0.443**	-0.486**	-0.430**
Days between assessments	0.001	0.002*	0.001	0.001	0.001
Fall of kindergarten rating	0.313**	0.294**	0.255**	0.312**	0.248**
Number of Cases	9,559	9,559	9,559	9,559	9,559
R Squared	.12	.13	.15	.12	.16

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 17

Average levels of academic engagement of fall 1998 kindergartners, by language minority status

Academic engagement measure	Language minority status			
	NE	Language Exposure	LM/Fluent	LM/Limited
Affective				
School attitude composite	5.40	5.41	5.37	5.32
	(0.0140)	(0.0420)	(0.0500)	(0.0710)
Behavioral				
Student reads three times per week	0.68	0.70	0.56	0.51
	(0.0090)	(0.0190)	(0.0320)	(0.0280)
Works to best of ability	0.85	0.85	0.85	0.77
	(0.0060)	(0.0140)	(0.0180)	(0.0240)
Approaches to learning scale	2.99	2.94	2.99	2.84
	(0.0130)	(0.0270)	(0.0330)	(0.0350)
Total N	10,655	1,389	976	838
Sum of weights	2,988,015	354,363	226,486	242,788

Note: Standard errors appear in parentheses.

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Table 18

Estimated effects of language minority status and selected variables on standardized math score in the fall of kindergarten and spring of first grade for fall 1998 kindergartners

Variable	Estimated effects in standard deviation units			
	Fall of kindergarten math score		Spring of first grade math score	
	(1)	(2)	(3)	(4)
Language minority status				
LM/Limited	-0.829**	-0.443**	-0.130*	-0.098
LM/Fluent	-0.273**	-0.132*	0.053	0.088
Language exposure	-0.092	-0.026	-0.010	0.001
Academic engagement				
School attitude composite	0.008	0.017	0.007	0.010
Student reads three times per week	0.108**	0.091**	-0.022	-0.014
Works to best of ability			0.265**	0.236
Approaches to learning scale	0.569**	0.445**	0.198**	0.187
Race-ethnicity				
Black, non-Hispanic		-0.241**		-0.236
Hispanic		-0.207**		-0.064
Asian/Pacific Islander		0.077		-0.211
Other race		-0.251**		-0.107
Socioeconomic status				
Parental education				
High school or less		-0.179**		-0.104
Bachelor's degree or higher		0.277**		0.032
Annual household income ($1000s)		0.002**		0.000
Parental occupational status		0.007**		0.001
Immigrant status				
Child is foreign born		-0.079		0.036
Parent is foreign born		0.032		0.004
Controls				
Age in fall of kindergarten	0.542**	0.570**	0.023	0.045
Male	0.172**	0.143**	0.101**	0.098
Repeating kindergarten in 1998-1999	-0.061	-0.024	-0.245**	-0.233
Days between assessments			0.004**	0.004

Table 18 Continued

Variable	Estimated effects in standard deviation units			
	Fall of kindergarten math score		Spring of first grade math score	
	(1)	(2)	(3)	(4)
Fall of kindergarten math score			0.086**	0.080
Number of Cases	13,686	13,686	13,686	13,686
R Squared	0.27	0.38	0.52	0.53

** p<0.01; * p<0.05 two tailed

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Note: The reference group includes students who were non-LM, female, white, non-Hispanic, had parents with some postsecondary education, were not foreign born, whose mother was not foreign born, and who enrolled in kindergarten for the first time in the 1998-1999 school year.

Table 19

Univariate statistics for selected variables, fall 1998 kindergartners

Variable	Mean	SD	Min	Max
Race-ethnicity				
Black/African-American	0.161	0.367	0.000	1.000
Hispanic	0.187	0.390	0.000	1.000
Mexican/Mexican-American	0.102	0.302	0.000	1.000
Other Hispanic	0.041	0.198	0.000	1.000
Detailed category missing	0.044	0.205	0.000	1.000
Asian/Pacific Islander	0.035	0.184	0.000	1.000
Chinese, Japanese, Korean, Asian Indian	0.009	0.095	0.000	1.000
Other Asian	0.016	0.127	0.000	1.000
Detailed category missing	0.009	0.096	0.000	1.000
Other race	0.039	0.193	0.000	1.000
Native American or Alaskan native	0.017	0.129	0.000	1.000
Multiracial	0.022	0.147	0.000	1.000
Socioeconomic status				
Parental education				
High school or less	0.384	0.486	0.000	1.000
Bachelor's degree or higher	0.287	0.452	0.000	1.000
Annual household income ($1000s)	50.161	53.406	0.000	1000.000
Parental occupational status	44.699	10.988	29.600	77.500
Immigrant status				
Child is foreign born	0.026	0.160	0.000	1.000
Parent is foreign born	0.148	0.355	0.000	1.000
Academic engagement				
Affective				
School attitude scale	5.389	1.020	0.000	6.000
Behavioral				
Child reads three times per week	0.660	0.474	0.000	1.000
Works to the best of ability	0.843	0.364	0.000	1.000
Approaches to learning	2.973	0.677	1.000	4.000

Table 19 Continued

Variable	Mean	SD	Min	Max
Additional control variables				
Age in fall of kindergarten	5.698	0.360	4.500	6.600
Male	0.516	0.500	0.000	1.000
Repeating kindergarten in 1998-1999	0.042	0.200	0.000	1.000
Days between assessments	555.239	24.310	476.000	645.000

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.

Table 20

Average academic achievement of fall 1998 kindergartners, by assessment type, subject, round, and language minority status

Academic achievement measure (evaluation type, subject, and round)	Analytic sample[1]		Language minority status							
			NE		Language exposure		LM/Fluent		LM/Limited	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Standardized assessment scores[2]										
Math										
Fall of kindergarten	19.4	7.1	20.1	7.1	19.1	7.2	17.7	6.8	13.0	4.0
Spring of first grade	43.2	9.2	43.7	9.1	42.9	9.1	42.3	8.5	36.8	8.7
Reading										
Fall of kindergarten	22.8	8.6	23.0	8.5	22.3	9.4	20.2	8.3		
Spring of first grade	55.7	13.8	55.9	13.8	55.2	14.4	54.0	13.8		
General knowledge										
Fall of kindergarten	22.3	7.4	22.8	7.4	21.0	7.2	17.1	5.9		
Spring of first grade	34.9	7.1	35.3	7.0	33.9	7.2	31.1	7.1		
Academic teacher ratings										
Math										
Fall of kindergarten	2.6	0.8	2.7	0.8	2.5	0.8	2.3	0.8	2.1	0.7
Spring of first grade	3.4	0.9	3.5	0.9	3.5	0.9	3.4	0.9	3.1	0.9

Table 20 Continued

Academic achievement measure (evaluation type, subject, and round)	Analytic sample[1]		Language minority status							
			NE		Language exposure		LM/Fluent		LM/Limited	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Reading										
Fall of kindergarten	2.5	0.7	2.6	0.7	2.5	0.7	2.2	0.7	1.9	0.6
Spring of first grade	3.4	0.9	3.4	0.9	3.5	0.9	3.4	0.9	3.0	0.9
General knowledge										
Fall of kindergarten	2.7	1.0	2.7	1.0	2.6	1.0	2.4	0.9	2.0	0.8
Spring of first grade	3.3	1.0	3.3	1.0	3.3	1.0	3.2	1.0	2.9	0.9

[1]Includes all cases with valid data for both the fall of kindergarten and spring of first grade achievement measures.

[2]Reading and general knowledge standardized assmessment data is not available for limited English proficient students, and math standardized assessment data is only available for limited English proficient students who are proficient in Spanish.

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K), Longitudinal Kindergarten-First Grade Public Use Data File and First Grade Restricted-Use Data File.