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ENGLISH ORAL LANGUAGE, GENERATION STATUS, AND THE EDUCATIONAL PERFORMANCE OF IMMIGRANT CHILDREN

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Abstract

This study examines the educational achievement of immigrant children during elementary school using the Early Childhood Longitudinal Study – Kindergarten cohort of 1998-1999 (ECLS-K). I examine patterns of fifth-grade achievement in reading, mathematics, and science, as well as achievement growth rates in reading and math from first through fifth grade. The English skills of immigrants are fundamental to curriculum comprehension, student achievement, teacher ratings, and social integration in school, so in the interest of determining predictors of English acquisition, I also estimate the relationships between English ability measured at the start of kindergarten and demographic characteristics, including ethnicity, immigrant generation status, geographic residence, and family background. Finally, drawing on the theoretical framework of "segmented assimilation" for explaining immigrant adaptation, I examine whether immigrant students' achievement demonstrates evidence of "immigrant optimism" (Kao and Tienda 1995; Ogbu 1991). I do so by estimating the relationship between generation status and achievement, controlling for correlates of duration of time in the United States, in particular, socioeconomic status and English ability. I compare the achievement of first generation (born abroad), second generation (born in the U.S. to parents born abroad), and third-or-higher generation students.

Kindergarten English oral language skills are measured using the Oral Language Development Scale, an assessment specifically designed to measure the English proficiency of second-language English learners. It was administered to all language-minority students in the sample, and thus a sizeable number of immigrant students.

Immigrant optimism is measured using a scale of parents' educational expectations for their children and teacher ratings of students' learning-related behaviors.

'Segmented' adaptation theoretical frameworks propose that factors besides time spent in the United States are more proximal to educational outcomes, and accordingly, I find that first and second generation students demonstrate higher achievement than third-or-higher generation students but *only* when such factors are controlled. In particular, I find that early English oral language ability is directly related to achievement in reading, math, and science. It mediates the relationship between generation status and fifth-grade achievement, controlling for ethnicity and family background characteristics. Linear growth models demonstrate that first generation students have higher growth rates in reading, while second generation students have higher growth rates in math than third-or-higher generation students. Further, first and second generation students score higher on the immigrant optimism scale than third-or-higher generation students. Differential achievement among ethnic groups are also evident even when controlling for generation status and its correlates. I suggest that these findings provide strong support for both the segmented assimilation and the "immigrant optimism" hypotheses.

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We must walk consciously only part way toward our goal, and then leap in the dark to our success.

--Henry David Thoreau

CHAPTER ONE
INTRODUCTION

Approximately 20 percent of American students under the age of 18 are from immigrant families (Hernandez 2004). This number has risen dramatically during the past decade. In 1994, the foreign-born population accounted for 8.7 percent of the U.S. population (Hansen 1994), whereas in 2003, the proportion had risen to nearly 12 percent, an increase of over 30 percent in just 9 years (Larsen 2004). Therefore, the unprecedented number of immigrant students, both foreign-born and those born in the U.S. to foreign-born parents, who will be entering the American educational system is a cause for concern among educators. This is because providing equal educational access to students from diverse ethnic backgrounds, while at the same time meeting the educational needs of native students, is a daunting task.

Further, the socioeconomic circumstances of immigrant families vary dramatically. For instance, in 2002, almost 17 percent of the foreign-born population lived below the poverty line, compared to almost 12 percent of natives. Further, over 21 percent of the Hispanic population in the U.S. lived below the poverty line, a rate that is almost three times that for non-Hispanic Whites (Ramirez and de la Cruz 2002). Hispanic children lived in poverty at a rate of 21.4 percent compared to 7.8 percent for non-Hispanic children, and notably, Hispanics accounted for over 53 percent of the foreign-born population in the U.S. in 2002 (Larsen 2004).

Numerous studies have demonstrated that a child's home background, including the education and income of parents, the physical characteristics of the home and the availability of cognitively beneficial resources, strongly influence their transition to formal schooling, intellectual development, and eventual educational achievement (Alwin

and Thornton 1984; Brooks-Gunn, Klebanov, and Duncan 1996; Duncan et al. 1998; Guo and Harris 2000). Therefore given the relatively lower socioeconomic standing of many immigrant families, the ability of immigrant parents to provide an intellectually stimulating environment may be weakened, relative to average native-born middle-class parents.

Parents' socioeconomic status (SES) has also been shown to affect the development of oral language skills. Bernstein (1973) and Heath (1983) demonstrated that parents with higher SES develop linguistic skills in their children more closely compatible with those skills expected at school. One study found that a child's early oral language skills have significant direct effects on educational achievement through the fourth grade, as well as on teacher ratings of students' academic progress, net of family income, mother's education and student's non-verbal IQ (Durham and Farkas, forthcoming). These findings have important implications for immigrants' school performance, given that most immigrant children come from a home in which the primary language is non-English. The development of strong oral language skills is likely contingent on the exposure one has to a given language. Moreover, there is little consensus among researchers about the manner in which skills from a native language transfer to a second (Crawford 1995).

Further, family language background has effects on educational performance that are both direct and indirect. First, a student with a strong foundation in the English language is more likely to comprehend well the material imparted at school, since English is the language in which schooling is conducted. Research also suggests that immigrant students with language obstacles are placed in remedial language tracks, i.e.,

"English as a Second Language" (ESL) so that their educational trajectories look different from native students (Gershberg, Donenberg and Sanchez 2004; Valdes 2001). Teachers may evaluate students' overall ability based on their language ability, and importantly, speech patterns valued at home may be valued differently at school (Heath 1983; Wong-Fillmore and Snow 2000).

Studies also suggest that language assistance programs isolate children from mainstream English speakers, which is detrimental to their progress in learning the English language (Valdes 2001). Such students may miss opportunities to take more advanced coursework that could prepare them for higher-level mathematics and science classes in high school in preparation for college admission requirements (Rumberger and Gandara 2000).

Immigrant students are also at risk of social isolation and discrimination in school, as a result of their ethnic minority or language status (Suarez-Orozco and Suarez-Orozco 2001). Students who are underrepresented at school may experience this discontinuity as alienating and threatening to their sense of self. When a minority group's culture, identity, or behaviors are differentially valued by institutions of the dominant society, minority students are placed at risk for isolation and discrimination (Suarez-Orozco and Suarez-Orozco 2001; Valenzuela 1999). Alternatively, such partial isolation may be beneficial to immigrant children because of greater social cohesion among those identified as "different." For instance, Portes (1999) finds that identification with American culture did not, as might be expected, predict higher achievement among immigrant students. Some research (c.f, Bankston and Zhou 1995) suggests that fidelity

to one's cultural group and maintenance of ethnic ties is beneficial for educational achievement.

Accordingly, the question of whether linguistic assimilation, an index of social assimilation, is beneficial for educational performance will be examined in the current study. Regarding social cohesion, I will also test whether variation in schools' ethnic concentrations, or "limited English Proficient" (LEP) concentrations, affect the learning trajectories of immigrant children, above and beyond individual ethnic, socioeconomic, and linguistic characteristics.

The literature on immigrant assimilation suggests that children of immigrants follow a variety of paths toward assimilation; "segmented assimilation" is one label given to this phenomenon (Gibson 1998; Portes and Zhou 1993). On the one hand, straight-line assimilation would suggest that with time, immigrant students' performance rises to the level of native students. But conversely, not all native students perform on their expected grade level, and thus immigrant students identifying with such natives may experience "downward assimilation" into an under-performing group of students. Researchers have found that high school immigrant students with lower socioeconomic status in inner cities adopted a minority identity, reducing their eventual educational attainment (Hirschman 2001; Landale, Oropesa, and Llanes 1998). For immigrant students there is a tension between retaining one's ethnic identity and cultural practices and the adoption of American identities and behaviors. Thus, it is unclear whether faster assimilation to American norms leads to better educational outcomes, since assimilation into a lower-performing ethnic group could retard educational progress. On the other hand, more rapid assimilation could lead to better evaluations by teachers and other

school personnel, as well as acquisition of strong English ability, which could lead to better academic performance. Or conversely, strong English skills may facilitate more rapid assimilation into a demoralized ethnic minority group leading to lower school performance, if given the right circumstances.

A large amount of research suggests that the educational expectations and achievement of more recently arrived immigrants is higher than that of their native-born counterparts. Portes and Rumbaut and colleagues, using data from the Children of Immigrants Longitudinal Study (CILS), consistently find that of the first generation, more recently-arrived students have higher performance than those spending more time in the U.S. Also, first generation immigrant students seem to have higher expectations and performance than the second generation (Portes and Rumbaut 2001; Rumbaut 1995), but this effect is surprising given immigrants' lower levels of economic resources and weaker English ability.

Researchers Kao and Tienda (1995) report find similar findings, calling it evidence of "immigrant optimism." Also discussed by Ogbu (1991), immigrants are found to hold more optimistic attitudes than natives about their chances for success in the U.S., since opportunities in their native country were so much poorer than those in the U.S. These higher expectations are reported to transfer to their children who consequently show relatively higher levels of effort and motivation than native-born children, ultimately translating into higher achievement among more recently-arrived students. In this study, I test whether there is evidence of immigrant optimism, and whether this variable mediates the effect of immigrant generational status on educational performance.

These three immigration-related variables, socioeconomic status, English language ability, and "immigrant optimism," are important factors in the educational success of immigrant children. Most importantly, the educational achievement of these immigrant students will be central to their labor market success and the places they attain within the U.S. occupational structure. Further, in view of the relatively high fertility of recent immigrant groups, the educational success of these students will help shape the skill-level of the American labor force for years to come (Hernandez 2004).

In this dissertation, I test for the relationships among ethnicity, generation status, SES, geographic residence, English language ability, immigrant optimism, and educational achievement from first through fifth grade. The following chapter reviews the prior literature in this area. In Chapter Three I present the data set analyzed, the Early Childhood Longitudinal Study, Kindergarten Cohort of 1998-99 (ECLS-K), and explain the statistical methods and subsequent analyses. Additionally, I provide a detailed description of a special analysis sample from the ECLS-K I created for the analyses.

Chapter Four presents descriptive results, which include means and standard deviations for variables in the ECLS-K considered relevant to analyses on immigrant children and their educational performance. I will examine distributions according to ethnicity and generation status, and the characteristics of the schools attended by the analysis sample and how they compare to American schools as a whole.

Chapter Five reports analyses of fifth grade achievement outcomes in reading, math, and science. This is important given that fifth-grade performance often serves as a predictor of the coursework attempted by students in high school, meaning that fifth

grade achievement often establishes one's educational trajectory for ultimate educational attainment. Fifth grade outcomes also reflect what has been learned since preschool.

In order to more closely examine the process of achievement during elementary school, Chapter Six presents linear growth models from first through fifth grade for reading and math achievement. This chapter also reports the results of fitting contextual models, where school-level controls for concentrations of poverty, limited English proficiency, and ethnic groups are used to discover whether such concentrations explain variation in achievement in addition to individual-level factors. Chapter Seven provides a summary and discussion of all findings. It also examines the limitations of the data and methods, as well as policy implications and recommendations for future research.

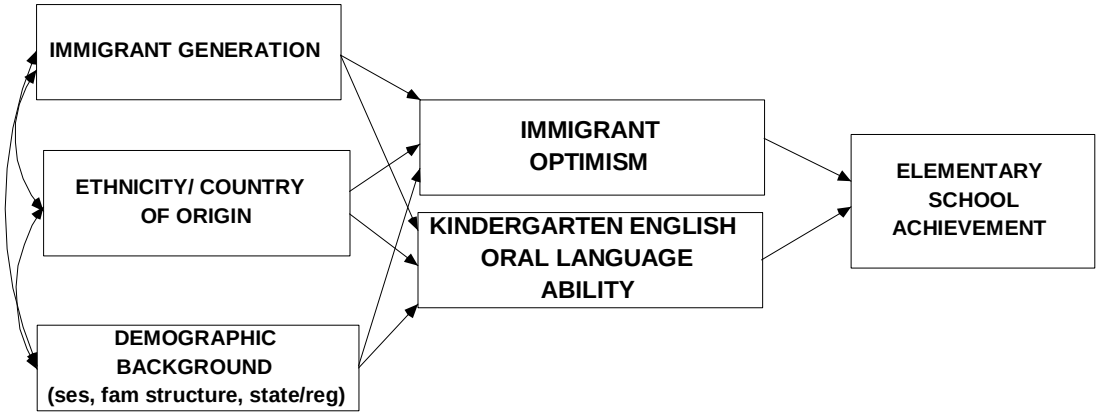
CHAPTER TWO
LITERATURE REVIEW

This chapter provides a review of the research on immigrant children's educational performance in the United States. When examining the relationship between immigrant students' experiences in American schools and achievement outcomes, it is essential to acknowledge the interdependency of many demographic and social influences. I suggest that among the most important are generation status (an index of time in the U.S.) and English language ability. A conceptual model of the hypothetical relationships proposed in this study is shown in Figure 2.1. First, factors such as race and ethnicity, and geographic location are highly correlated with time in the U.S. (indexed by generation status), and current socioeconomic status. Further, I hypothesize that language ability and immigrants' orientation towards their potential for upward mobility and dispositions towards schoolwork are related to demographic background factors such as ethnicity and SES, but also mediate the influence of these characteristics on school achievement. Below, I discuss how research has theoretically framed these relationships and linked immigrant characteristics to educational performance.

Demographic Correlates of Immigration

Several factors are consistently examined in the literature regarding immigrants' educational performance. First, nativity, or country of origin, bestows various resources to an individual arriving in the U.S., such as language background and socioeconomic position. Most arriving immigrants today have Latin American or Asian origins. Thus, most have a non-English home language background, which presents challenges for both parents and children adapting to life in the U.S.

Figure 1 A Conceptual Overview of the Current Study



Importantly, country of origin is associated with varying levels of education and income. Feliciano (2006) demonstrated concrete differences in pre-migration educational status by country of origin (Table 1: 289). For instance, families from India and China had relatively higher levels of educational attainment than those from Mexico or Korea. Also, immigrant socioeconomic status in the U.S. varies both by country of origin and a group's ability to translate pre-migration human capital into post-migration earnings and occupational status (Borjas 1985; Chiswick 1986). Feliciano (2006) found that some groups, such as Indians and Filipinos, have similar pre- and post-migration SES, while others, such as Haitians, Dominicans, and Ecuadorians experience significant declines in their pre-and post-migration SES. This underscores the need to account for both nativity, *current* SES, and their interrelationship when investigating patterns in the educational performance of immigrant children.

Second, time in the U.S., indexed by one's immigrant generation status in the current study, determines levels of acculturation to the norms, expectations, and the American ethos in general. Also, time in the U.S. is strongly related to immigrant families' accumulation of human and financial capital. A great deal of research has specifically examined how generation status relates to educational performance, but with mixed results. Explanations for such discrepancies will be discussed further below.

Third, another important variable is context of reception, which refers to those resources bestowed upon an immigrant as a result of the perceived value of their characteristics. For instance, refugees and undocumented immigrants receive vastly different receptions in financial assistance by the host government, and in attitudes of employers and the general populace. These resources may include official recognition and settlement policies, social capital from established ethnic enclaves, and with regard to educational experiences, special school programs for immigrants. The social reception of immigrants is also subjectively received and suggests the need for a consideration of the psychological determinants of educational achievement at both the level of parents and children. Each of these factors, nativity and ethnicity, SES, context, and perceptions of post-migration opportunity will be examined in the current study.

Theoretical Frameworks

Sociological theorizing on the determinants of the differential assimilation of immigrants extends back to the early years of the 20th century. Since that time, the demographic characteristics of arriving groups have changed dramatically. While prior waves of immigrants arrived primarily from European countries, the majority of current waves come from Latin America and Asia. While European immigrants looked much

like Americans of the time (except perhaps for phenotypic variation between northern and southern Europeans), current groups physically look more like existing minority groups in the U.S. than Anglo and other European descendents. This suggests that many of the new immigrants are at risk for discrimination and its consequences, which certainly bears on the experiences of social and economic assimilation.

Early theories of immigrant assimilation presumed that assimilation into the American mainstream was primarily linear, whereby immigrants' level of socioeconomic, cultural, and linguistic adaptation would be largely proportional to the amount of time they had been in the United States (Gordon 1964; Kennedy 1944; Park 1930). "Straight-line Assimilation Theory," essentially stated that immigrants, over time would simply "melt" into the American mainstream as they began to speak the language and interact with mainstream society.

Classical assimilation theory also suggests that as time passes, future generations will approach complete accommodation to the new society. According to a generation-change model, the first generation (those who were born in a foreign country) may achieve some semblance of economic stability, a rudimentary ability to speak English, and with time, a meager level of cultural assimilation as they interact with established American social groups. Their children, the "second generation," would develop a higher facility with English, a greater acceptance of American behaviors and value systems, and thus, would appear more like native-born Americans. Finally, "third generation" immigrants, the grandchildren of the foreign-born population, would be nearly indistinguishable from native-born Americans, as a result of English fluency and absorption into American mainstream occupational structure and social institutions.

However, given recent changes within the American occupational structure and the characteristics of current immigrant waves, the classic theories of assimilation may not apply, and have been criticized on several fronts (Alba and Nee 1997; Gans 1992; Massey 1990; Portes 1995; Portes and Zhou 1993; Portes 1996; Zhou 1997). Criticisms have included: differences in the physical characteristics between earlier and current immigrants, changing occupational demand (increasing skill requirements), increasing cultural heterogeneity in the U.S., and failure to consider contexts of reception. Further, social interaction leads to a reciprocal process of assimilation between the new immigrations and the host society. Thus, the construct of 'assimilation' itself has been subject to rigorous debate. As immigrants compose an increasing share of the host society, social norms and customs are likely to adapt to arriving groups just as much as new immigrants adapt to existing circumstances in the new country (see Alba and Nee 1997).

Researchers have further refined the framework for examining immigrant adaptation in the U.S. in response to such critiques. In particular, Portes and Zhou (1993) proposed the "segmented assimilation" hypothesis. This predicts that immigrant adaptation is contingent upon financial resources, ethnicity, language ability, geographic location of residence in the U.S., country of origin, and the economic characteristics of the host society (the 'supply and demand' components of immigration – c.f. Borjas 1985; 1999).

Portes and Zhou (1993) discussed three possible pathways of assimilation for immigrants based on these factors. First, mainstream acculturation and structural integration into the middle class is possible. Second, immigrants could experience

downward assimilation into an oppositional subculture, such as that found among disadvantaged minorities in inner cities. Third, immigrants may undergo segmented assimilation, which occurs when structural assimilation is achieved (the attainment of normative economic and occupational status) but without full acculturation to American norms or social expectations. This results in immigrants' selective retention of native cultural traits, such as language, religion, ethnic identity, and other traditional values. In theory, these characteristics mediate immigrant outcomes to produce a great deal of variation in assimilation patterns.

Generation Status and Immigrant Educational Performance

Prior research has found that second- and third-and-higher generation students generally have lower academic performance than first generation students (Glick and White 2003; Kao and Tienda 1995; Padilla and Gonzalez 2001; Portes 1995; Portes and MacLeod 1996; Portes and Rumbaut 2001; Rumbaut 1995; White and Kaufman 1997; Zsembik and Llanes 1996). Yet these findings are surprising, since first generation students have less experience in the American educational system, do not typically come from English-language backgrounds, and often have families with lower then average socioeconomic status. Also, these outcomes refute a "straight-line" assimilation framework, which would suggest that native-born American students' performance sets the standard that newer arrivals would strive to replicate. Such a pattern instead suggests evidence of segmented assimilation, which suggests outcomes are more proximally related to factors other than time in the U.S., such as ethnicity, SES, residence, or English ability.

Numerous studies of the adaptation of immigrants in the Miami/Fort Lauderdale and San Diego areas were conducted by Alejandro Portes, Ruben Rumbaut and colleagues (Portes and Rumbaut 2001; Portes and MacLeod 1996; Rumbaut 1994; Rumbaut 1995; Rumbaut and Portes 2001). Their analyses consistently demonstrated that more recently arrived immigrants and children of immigrants had more successful educational outcomes than native-born students, including performance on reading and math assessments and grade point average (GPA).

Similarly, Glick and White (1997) found that as time in the U.S. passed, student test scores fell. The authors also noted that English language facility had positive and significant direct effects on test scores. Also, White and Kaufman (1997) drew parallel conclusions about the effects of English ability; however, in contrast to the findings of other studies, they found that length of residence had a *negative* effect on the likelihood of dropping out of high school.

One of the most influential studies of immigrant generational effects was conducted by Kao and Tienda (1995). They offered the "immigrant optimism" hypothesis as an explanation for the often-noted superior performance of more recently arrived immigrants (see also Ogbu (1991)). This hypothesis proposed that parents and students who recently emigrated from a foreign country have a "dual frame of reference," whereby they are able to compare their situation in America with their former lives in the native country. In an examination of the performance of first and second generation Black, Asian, and Hispanic high school students, Kao and Tienda (1995) found that, after controlling for SES, first and second generation students earned higher grades and had higher aspirations than third-and-higher generation students. The authors stated that "the

immigrant status of the parents rather than that of children is key in determining educational outcomes" (1995:15). The optimism of the recently arrived group served as a motivating factor in producing a higher commitment to educational attainment. Moreover, since second generation immigrant students reported higher English proficiency, as well as having the "optimistic" influence of their parents, they appeared to be the best-positioned to succeed educationally.

However, not all previous studies of generational effects reach the same conclusions. Wojtkiewicz and Donato (1995) examined the effect of foreign nativity on the educational attainment of Mexicans and Puerto Ricans and compared it to that of native-born Whites. They found that foreign-born Latinos had lower graduation rates than natives. Portes and MacLeod (1996) also found generation status to be influential, but length of residence had a *positive* effect on school achievement, similar to the findings of White and Kaufman (1997). Given these conflicting findings, further research exploring the relationship between time in the U.S. and educational achievement is needed.

Student effort, also conceptualized as school engagement, is another well-known determinant of school success (Carbonaro 2005; Farkas et al. 1990; Marks 2000). The immigrant optimism hypothesis posits that first generation parents' and students' dual frame of reference (their awareness of the greater economic opportunities in the U.S. compared to their country of origin) drives greater effort toward educational success. To more recent arrivals to the U.S., educational attainment is often perceived as a central avenue of upward economic and social mobility (Ogbu 1991). Of course, this is typically more the case for parents than for student peer groups (Coleman 1961; McDill and

Coleman 1965). However, parent-child conflict, particularly in third-and-higher generation families, could reduce the effect of such parental aspirations on student effort. Moreover, characteristics of peer groups, such as their average SES, ethnicity, or language use may contribute to student orientations toward educational achievement.

English Skills among Immigrant Students

One reason why the findings of higher educational performance among more recent arrivals are surprising is their relative lack of exposure to the English language (at least among the vast majority of immigrants to the U.S.). The English oral language skill of entering immigrant students (or children of immigrants) is an essential variable to consider when examining their educational performance for several reasons. First, English is the language in which most formal schooling is conducted; thus, facility with English allows for better comprehension of the curricula.

Second, English language ability has implications for social incorporation into peer groups at school. Lack of English ability may cause social isolation (Suarez-Orozco and Suarez-Orozco 2001; Wong-Fillmore and Snow 2000). Conversely, stronger English skills could accelerate assimilation into a lower-performing peer group, if English subsumes facility with an ethnic language that strengthens ethnic ties within school (Valenzuela 1999). Students with better English language skills may be more likely to be influenced by native peer groups, and if native-born students value school effort less (as is suggested by the immigrant optimism framework), immigrant students may be swayed by such dispositions in their own approach to school effort. However, weaker English ability combined with stronger native language skills may provide some level of protection from downward assimilation, as such students may find social cohesion within

groups of other newly arrived, non-English fluent students (Banks ton and Zhou 1995; Portes and Hao 2002).

Third, research has shown that early oral language skill even among native English speakers is a strong predictor of later educational performance. Given that most information exchange occurs orally during the early years of life, and that most instruction is delivered orally during the first few years of school, children with stronger oral English language ability are better situated to master the curriculum, to be rated highly by their teachers, and to transfer oral language knowledge to subject-matter learning, especially the reading curriculum (Bernstein 1975; Durham and Farkas forthcoming; Heath 1983; Neuman and Dickinson 2002).

Further, research has shown that oral language skills, such as phonological awareness and vocabulary knowledge, are strongly dependent on parents' SES. Hart and Risley (1995) recorded the speech interactions between parents and children of diverse socioeconomic backgrounds. Their findings demonstrated that higher-SES parents spoke more words and used more complex speech than their lower-SES counterparts. Heath (1983) also demonstrated that the different language styles used by the parents and children of various socioeconomic backgrounds translated into different levels of compatibility with expectations for language use when the children began formal schooling. This has important implications for research examining the relationship between English ability and immigrants' educational performance, since many immigrant families are relatively disadvantaged socioeconomically, as compared to native-born students' families. Thus, SES and language background work jointly in shaping the educational experiences of immigrant children, since weaker English oral language skills

are driven by SES and also affect teacher perceptions of ability, comprehension of the curricula, and early literacy skills.

There is a dearth of research examining the relationship between English ability and immigrant educational performance, mainly due to the lack of data on comprehensive English ability. All available studies rely on either self-reports of English ability or a single measure of home language background. For instance, Rumbaut (1995) and Portes and Rumbaut (2001) operationalized English ability using a self-reported measure, while Glick and White (2003), Wojkiewicz and Donato (1995), White and Kaufman (1997), Padilla and Gonzales (2001) examined the effects of reported fluency at home. Further, some research has explored the effect of "Limited English Proficiency" (LEP) status (e.g., Portes and Rumbaut, 2001) but this dummy variable likely fails to measure a great deal of meaningful variation. A similar approach was adopted by Kao and Tienda (1995) who propose LEP status as a mediator of the negative generational effects found in their study, yet in the analyses presented, the coefficients for LEP status were absent. Given these approaches, it is not surprising that in these prior studies the English language measure often fails to account for significant variation in students' academic outcomes. In the current study, actual English language assessment data will be utilized, offering a useful exploration into the mediating influence of English ability on generational effects and educational performance.

The Language Minority Label

For the current study, I created a special analysis sample based on the language minority (LM) students in the ECLS-K data set. LM status is a nearly perfect proxy for whether a student is from an immigrant family, with the exception of a few immigrant

groups who are from English-speaking countries, such as those in the West Indies or Great Britain. But importantly, placement into the LM status also raises a host of school-related problems and issues for such students. Below, I examine these and their relationships to immigrant students' educational performance.

The vast majority of immigrant students or children born to immigrant parents come from homes in which the primary language is non-English. However, it is not widely recognized that many third generation, or children of native-born immigrant groups, often present at school with English language difficulties because they come from families that remain in enclaves of non-English-speakers (Heath 1986; Zentella 2005). Gershberg, Donenberg, and Sanchez (2004) define the LM status as that identity ascribed to students who come from a home background in which a language other than English is used *at least occasionally*.

Schools typically screen new immigrant students using a home language survey that asks whether any family members *ever* use a language other than English at home. If the answer to any question is 'yes,' the child will be classified as LM (Gershberg et al 2004). As such, home language surveys are a relatively crude indicator of immigrant children's English language skills. These children may actually be fully English proficient (FEP), or even fully bilingual when they are classified as "limited English proficient" (LEP) or an "English language learner" (ELL). In addition, some students may be identified as LM at school simply because of their ethnicity (skin color) or immigrant status, although they are actually proficient in English (Valdes 2001). Indeed, some are reasonably competent as a result of immersion in English-rich environments,

e.g., exposure to American television shows, American music, magazines, games (Rodriguez 2005).

Importantly, the language ability of an immigrant is one of the student's most distinctive features, and will likely influence their schooling experiences for years to come. Indeed, research has shown that the LM status determines children's achievement trajectories in school. Many LM immigrant children are placed in LEP or English as a Second Language (ESL) tracks at school because of a perceived inability to benefit from mainstream classes, which may in turn impede normal academic progress (Valdes 2001; Gershberg et al 2005; Lee 2001; Rumberger and Gandara 2001). Other obstacles include stigmatization due to minority status; lowered teacher expectations as a result of language-related academic problems, and social isolation in school (Hakuta, Butler, and Witt 2000; Heath 1986; Suarez-Orozco and Suarez-Orozco 2001; Rumberger and Gandara 2000; Wong-Fillmore and Snow 2000). Thus, the LM label is potentially detrimental in terms of eventual academic performance, since schools often apply this label in order to assign students to language-related coursework, which has implications for rates of learning, teacher perceptions, and student interaction in school.

Placement of immigrant students in ESL tracks can be problematic because of improper identification, and because of inefficient or inadequate language assistance services. Studies have suggested there are often inadequate school resources and special programs to deal with LM students. Moss and Puma (1995) found that many LM students were not receiving adequate instruction or supplementary services in ESL assistance. Title III of the Elementary and Secondary Education Act (ESEA) stipulated that LM students should be guaranteed special assistance that will help them fully

participate in educational programs; however, almost one third were entirely denied such services, mainly due to of a lack of these services in the schools they attended. This dearth has been exacerbated by class-size reduction reforms, such as those enacted in California (Rumberger and Gandara 2000). Moreover, Rumberger and Gandara noted that there was an acute problem of under-preparation among language development teachers, especially for math and science curricula. Unfortunately, performance in math and science often predicts whether a students can participate in college track coursework, and as a result, many immigrant students may be permanently situated in lower (or ESL) tracks.

Valdes (2001) noted that the schools in her study tended to place most foreign-background students into ESL tracks (see also Valenzeula 1999) simply because they were not perceived to have academic language abilities at the appropriate mainstream level, although many had significant capabilities. She further found that the teachers assigned to teach ESL did not necessarily have specific training in teaching English to immigrant students. The ESL classes also offered few opportunities to develop necessary academic English skills; instead, they appeared remedial, taught in slow simplified English, and focused on subject-specific vocabulary word lists. Being placed in such classes also meant these students had few opportunities to interact with fluent English-speaking students, which has been found an important resource in developing English skills (Collier 1995; Fillmore 1991). Fewer opportunities for interaction with native students also serve to isolate and stigmatize immigrant students.

Some immigrant students do have positive experiences in language assistance coursework, thanks to well-trained teachers and an effective curriculum, but

unfortunately there is little consensus in the research as to what constitutes a good ESL program (Crawford 1995). Moreover, special programs are not only required to provide English instruction, but also simultaneous instruction in subject content. Given the daunting requirements of supplementary language programs such as ESL, immigrant LM students may well be underserved in their schooling experience.

Indeed, despite myriad language remediation programs, not all native U.S.-born students demonstrate English proficiency. These may include children of immigrants or even third- or higher generation immigrant students who come from a non-English background, or at least one in which a non-standard dialect of English is spoken (regarding non-standard dialects, see Ogbu 1999). In some Hispanic communities, children often learn what can be described as "pidgin" English, thus becoming fluent in a fusion of English and Spanish (Wong-Fillmore and Snow 2000; Zentella 2005), sometimes referred to as "Spanglish" (Stavans 2003). However, such fluency may not be amenable to a successful transition to school where fluency in standard English is expected and academic English skills are required for subject content learning (Collier 1995).

In sum, these findings suggest that immigrant students designated as LM face numerous obstacles upon entering the U.S. education system. Such students may be misclassified as being unable to benefit from mainstream instruction, potentially denying them important services or equal access to the standard curriculum in school, and therefore, their academic progress may be delayed or encumbered. Further, research on the testing of immigrant students suggests that highly dubious procedures are used to identify students with language difficulties, which has consequences for immigrant

students reporting they are from a non-English background (Rossell 2000). Moreover, those students who could benefit from ESL may be denied crucial services because of inadequate remediation curricula or a lack of resources.

Immigrants' Educational Experiences Within the School Context

For many immigrant students, the school context may not be conducive to high achievement. A mismatch between the structural characteristics of the school and immigrant student needs is often found when there is high minority representation, a high poverty rate in the student body, and when there is an adversarial climate (Crosnoe 2005). According to Crosnoe, Mexican immigrant students are often located in poorer school contexts as a result of family background factors that determine neighborhood, and thus school location. Such is likely to be true also for other historically disadvantaged groups like Puerto Ricans and other Hispanic groups, and unfortunately, negative school experiences can compound other background disadvantages, just as positive school experiences can compensate for poor home backgrounds (Snow et al. 1991). Further, overrepresentation of impoverished students appears to impact students' academic functioning during and at the beginning of school (Crosnoe 2005).

Evidence also suggests that poor and minority students attend schools with fewer important educational resources, such as equipment, advanced coursework, general physical surroundings, and teacher experience and training (Roscigno 1998). The consequences of contextual characteristics have been examined, and Crosnoe (2005) found that the proportion of the student body living in poverty had the greatest effect on mathematics achievement, followed by minority representation.

Minority concentration is likely to depress achievement because where minority groups attend school in a segregated context, an oppositional stance to school achievement may develop as such groups assimilate into lower-performing peer groups (Hirschman 2001), especially in densely populated metropolitan areas (Landale et al. 1998). This may also reflect the fact that higher minority concentration is often associated with higher poverty concentrations (Massey 1990), and lower performing oppositional peer groups are more prevalent in such environments (Orfield 1996). Additionally, students from lower-SES homes are also more likely to be placed in lower academic tracks, which have been shown to have lower academic press and offer little opportunity for advancement to academic coursework (Oakes 1985).

Research has shown that achievement is aided by associations with friendship groups that help individuals identify with positive social goals, such as school achievement and the rejection of delinquent behavior or oppositional behavior (Cooke, Herman, Phillips, and Settersten 2002). Also, Roscigno (1998) noted that peer aversion to achievement is created through the schooling process, specifically through grouping together lower-SES students. This process reflected factors such as teacher expectations, track placement, teacher-student ratios, and ethnic concentrations in the school.

However, some research has shown that ethnic concentrations have different effects; for example, since (according to Louie 2001), Asians are more likely than other ethnic groups to associate good grades with parental approval and to share their parents' expectations (Hao and Bonstead-Bruns 1998), a higher Asian concentration is likely to be beneficial for individual achievement. Conversely, research on Hispanic groups finds that higher concentrations are negatively associated with achievement (Crosnoe 2005),

likely due to the fact that Hispanics have higher rates of poverty than others (Asians, e.g.,). Further, social and human capital are integrally related, so the accumulation of useful social capital may be more limited in contexts with higher concentrations of students from lower-SES backgrounds (Lew 2006).

A great deal of ethnographic research has shown how the American school context can be incompatible with the educational needs of some immigrant groups. Valenzuela (1999) suggested that schools attended by large shares of Latino immigrant students are often characterized by disorganization, a lack of resources, low academic press, and a lack of caring understanding between teachers and students. Such factors result in students' experiencing school as something that subtracts from both their ethnic and cultural identity as well as their social capital.

Research has also suggested that context matters differentially for more or less-recently arrived immigrant students. Some studies find that more recently arrived students show higher achievement than U.S.-born students, and this phenomenon has indicated to some that U.S.-born youth are either 'lazy' or oppositional; however, Valenzuela (1999) argued that U.S.-born youth are simply opposed to a system that devalues their cultural and linguistic heritage. Hence, a process of disengagement may ensue, when, for example, Spanish language fluency is seen as an obstacle rather than a resource for achievement, or when students from lower-SES backgrounds fail to make useful social connections with higher-SES and higher-performing students or with teachers for assistance with schoolwork.

Summary

Prior research examining the educational performance of immigrant youth has focused on ethnic, generational, and socioeconomic differences, highlighting the ways that these factors jointly shape achievement, both at the individual level and in the school context. Further, while language has been shown to be an intervening factor, both cognitively and socially, few researchers have explored the ways in which English ability (or disability) shapes students' educational trajectories.

While most of the research demonstrates that more recent arrivals have higher school performance than earlier arrivals, this picture is complicated by the fact that English ability is fundamental to understanding the curriculum and interacting in the school's social structure, and importantly, it is highly dependent on time students are in the U.S. and the human capital students' families bring from their points of origin. Since more recent arrivals are likely to have a weaker command of academic English skills, findings showing a negative relationship between time in the U.S. and educational achievement are somewhat counterintuitive. This finding is even more puzzling in light of the fact that recent immigrant students have been shown to be relatively isolated if they are situated in language assistance tracks, although more recent arrivals have also been shown to have a stronger social network as compared to U.S.-born students. These findings indicate a need for research that simultaneously considers the effects of ethnic and family background, generation status, English ability, and the school context on educational achievement. Doing so is the goal of this study.

CHAPTER THREE
DATA AND METHODS

Description of the Data

I analyze data from the Early Childhood Longitudinal Study, Kindergarten cohort of 1998-1999. The ECLS-K sample is nationally representative and was collected using a stratified, multistage probability sample design. The ECLS-K study originally sampled 21,260 kindergarten students and includes a sizable number of immigrant children from Latin American and Asian countries. Further, the restricted-use files contain reports of parent and child country of birth (NCES 2002).

The data contain assessments of performance in language, reading, math and science as well as measures of family context and socioeconomic background collected during parent interviews. Data on schools attended by the ECLS-K students also provide information about concentrations of minorities, students with limited English proficiency, and proportions of students eligible for free and reduced-price lunches (NCES 2000). The ECLS-K is thus a particularly useful data source for examining the educational performance and experiences of immigrant students.

The Sample

For the present study, I constructed a special analysis sample from the ECLS-K. Following the practice of previous researchers (e.g. Portes, Rumbaut and colleagues) who focused their sampling procedure around schools with higher-than-average populations of immigrant students, I began by selecting all language minority (LM) students from the ECLS-K sample. First, the ECLS-K study identified all LM students from extant school records from the beginning of kindergarten. This group constituted 2,852 cases. Secondarily, the ECLS-K study further identified LM students based on parent

questionnaire items detailing language use in the home. If a non-English language was sometimes used in the home or if a parent sometimes spoke to the child in a non-English language, the child was classified as LM. While many of these students also had school records indicating LM status, some of these students (n=466) had not been previously identified at school. Thus, with the addition of these students, I began with a central sample of 3,318 LM students. It safely can be assumed that these are immigrant students, so in order to create a sizeable reference group of non-LM immigrant students, I selected all kindergarten students from the base year schools attended by at least two LM students.[1] This produced a total sample size of 9,758 from the base year wave of data. 5,097 of these students remained by the wave of data collection occurring when most students were in fifth grade.

A simpler analytic approach would have been restricting attention to LM students only, but that would have been problematic because of potential sample selection bias among third-and-higher generation students – third generation students who are LM may over-represent those with unmeasured cognitive deficiencies. Also, some immigrant students are not LM. Thus, selecting additional students from LM students' school provides a more appropriate comparison group of non-LM students who are first, second,

[1] I explored varying concentrations of LM students prior to electing a minimum of two LM students for the purpose of selecting schools. This criteria was based on the fact that the students in schools with high numbers of sampled LM students (e.g., 20 or more) were already included in the baseline LM group (n=3,318), since the number of sampled students per school was typically only around 20. (The ECLS-K sampled anywhere between 1 and 27 students per school in the baseline wave.) Further, attrition from kindergarten to fifth grade was high in the ECLS-K (slightly over 50% of the original sample was maintained through fifth grade), so reduction of the LM concentration criteria to 2 LM students was necessary in order to retain a respectable number of students having fifth grade assessments. It should be noted, however, that from a statistical standpoint, the 2-LM-student criteria is somewhat arbitrary in that the analysis sample is in no way intended to be geographically or demographically representative of the LM population in the United States.

and third-and-higher generation immigrants, especially since many immigrants' residences are clustered together.

Research Questions

In this study, I pose the following research questions, the first of which concern English oral language ability:

(1) What immigrant and demographic characteristics are associated with early English oral language ability at the start of kindergarten? How does generation status mediate the relationships between ethnicity and English ability? How does SES further mediate the relationships between ethnicity and generation status and English ability?

The second set of questions address whether immigrant families show greater levels of a construct proposed in the literature, 'immigrant optimism':

(2) Is there evidence of "immigrant optimism"? Do first and/or second-generation immigrant students show higher levels of school effort, and do their parents have higher educational expectations, than native U.S.-born students? Do SES and early English oral language ability mediate these relationships?

Next, I examine how demographic background characteristics are affected by generation status, and whether early English ability and 'immigrant optimism' mediate these characteristics on elementary school achievement. Research questions include:

(3) How does the academic performance in the fifth grade in reading, math, and science for first and second generation immigrant students compare to that of third or higher-generation students? Does performance vary by ethnic group net of generation status? Does early English oral language ability significantly mediate the relationship between generation status and fifth-grade subject-area performance?

Finally, I examine whether the relationships between immigrant background characteristics, language, optimism, and achievement interact with time:

(4) How does performance from first through fifth grade in reading and math vary over time? How are variations over time affected by ethnicity, generation status, SES, family composition and early English oral language ability? (5) Finally, do school contextual characteristics, such as ethnic concentration, socioeconomic concentration, and proportions of LEP students, explain variation in subject area performance growth beyond individual characteristics? In the final section of this chapter, I present the equations used to test these research questions.

Measures and Variables

Subject Area Assessments. The primary dependent variables used in this study are Item Response Theory (IRT) scores for reading, mathematics, and science. The ECLS-K assessed students at successive points in time, so changes in achievement can be analyzed (NCES 2000: 3-2 to 3-6). I employ the assessments from the spring semesters of first, third, and fifth grades, since achievement as early as first grade has been shown to be predictive of later achievement, up through high school and beyond (Alexander, Entwisle, and Horsey 1997). Thus, each student has a maximum of three data points for each assessment in reading and math. Science was assessed only during the spring semesters of the 3rd and 5th grades.

English Oral Language Development. In addition to outcomes in the three subject areas of reading, math, and science, I also analyze the relationship between background variables of interest and students' early English oral language ability. This variable is the student's English Oral Language Development Score (OLDS), measured when the

student began school in the fall of kindergarten. This assessment was primarily designed to measure whether LM students in the ECLS-K had English skills sufficient to participate in the subject-area assessments administered in English. (Thus, most of the students in the analysis sample were missing OLDS scores. I discuss issues of missing data in greater detail below.) Scores on the OLDS range from 1 to 60, where 37 was the low-end cut-off point that students needed to score in order to receive the assessments in English.

The OLDS assessment is an unusually good measure of students' English skills. Most of the prior studies of immigrants' English language abilities employ survey questions asking for self-reports of facility with English or simple dichotomous measures of whether English is the primary language spoken in the home. However, the OLDS assessment provides a concrete scale of children's actual English language skill, both receptive and expressive. The OLDS was adapted from the Pre-LAS published by CTB McGraw-Hill, an oral language assessment created specifically to measure the language ability of English-as-a-second-language learners. Designed to test pre-literate children between ages four and six, it gauges the students' skill with oral language morphology, syntax, and semantic components, with one-to-one testing techniques. Assessment methods include: "Simon says," "choose the picture," "say what you hear," "finishing stories," "let's tell a story," and naming household items in a picture.

Analyses in the current study tested what factors are related to early English language ability among immigrant students and whether English language ability mediates the effects of immigrant background variables on student achievement. However, the use of OLDS presented some analytical challenges, because only the LM

students identified through school records were administered the OLDS assessment. Therefore, I used multiple imputation techniques to predict OLDS scores for those students not administered this assessment. (This procedure will be discussed further below).

Immigrant Optimism. This measure is comprised of two variables from the ECLS-K, parents' educational expectations and students' 'approaches to learning.' Although each measure could be used independently in the analysis, I chose to scale them for several reasons. First, concerning parents' expectations, the hypothesized relationship (both here and in the prior literature) proposes that immigrant parents have a "dual frame of reference" (Ogbu 1991) whereby they are optimistic about their chances for upward mobility in the U.S. because of its perceived relatively open class structure. Therefore, believing that success in school is the primary avenue by which one becomes successful, they will strongly encourage, by various means, their children to have high achievement (Kao and Tienda 1995). Accordingly, to measure this orientation, I use parents' expectations for their children's educational attainment. When the students were just beginning kindergarten, parents were asked to report the ultimate level of education they expected from their child. Answers ranged from 1 to 6 where 1 is 'not complete high school' and 6 is 'Ph.D., M.D. or other advanced degree.'

Further, if immigrant optimism is driven by the parents, then the evidence should lie in their children's levels of work effort. Thus, the second component of the construct 'immigrant optimism' is children's 'approaches to learning' rating. Kindergarten teachers were asked to rate individual students' various learning-related attitudes and behaviors at the beginning of school, an ECLS-K composite measure intended to index

several dimensions, including task persistence, attentiveness, enthusiasm for learning, independence, and organization. Teacher reports of approaches to learning serve as a measure of whether the student is perceived as working harder at school, thus showing more energy and optimism toward school success.

Moreover, these two variables are highly correlated, so for mathematical reasons, the best operationalization of "optimism" is a single variable. In a reliabiltiy analysis, the Cronbach's Alpha was .15. In analyses not shown, I entered them independently into a single regression equation, and the results were substantively the same as when they are entered as a single construct. Accordingly, I transformed these variables into two z-scores, and then averaged them. The resulting variable is termed 'Optimism Z-score.' Prior research suggests that this is a sound procedure, since parents' expectations guide student effort, which reciprocally may affect parents' expectations. Thus, these two variables work in concert.

Ethnicity. The ECLS-K baseline wave provides a composite race variable including identifiers for White, non-Hispanic; Black, non-Hispanic; Hispanic, specified; Hispanic, not specified, Asian; Pacific Islander; American Indian; and more than one race. In addition, Asian and Hispanic respondents could specifically identify their nativity in the spring first-grade wave of data collection. For Asians, respondents identified as Asian Indian; Chinese; Korean; Japanese; Vietnamese; Filipino; Hmong; or Other Asian Country. Among Hispanics, respondents specified Mexican; Puerto Rican; Cuban; or Other Latin Country. For those who responded 'Other Asian Country' or 'Other Latin Country,' further identification of nativity was determined from mother's report of her country of birth, which was contained in the first-grade restricted-use files. Initial

analyses made full use of these nativity variables; however, for the final analyses, I collapsed groups into ethnic or nativity categories that were large enough to produce statistically significant differences. This decision was also made due to relatively small sample sizes within some nativity specifications. Thus, the final analyses include dummy control variables for: Mexican; Puerto Rican; Cuban; Asian Indian; Chinese; Hispanic, not specified; Asian, not specified; White, non-Hispanic; and Black/other minority.

Generation Status. Generation status was determined using the parents' report of where they were born as well as the child's birthplace. These variables were obtained from the Restricted-Use First Grade Wave of the ECLS-K (NCES 2002). Information about students' grandparents nativity was not available, so generation status could be firmly determined for first generation students (child born outside the U.S.) and second generation students (child born in the U.S. to parents born outside the U.S.). The remainder of cases who were not identified as first or second generation were assigned third-and-higher-generation status.

In most cases, parents' report of their own nativity was based on the mother's birthplace, but if the father's report was available, his nativity was also used. Since the majority of cases had parental reports of nativity from only the mother, it was not possible to create a category of generation status for children whose parents were 'inter-married' from different countries (e.g., one Mexican parent and one American-born parent). As a result, the child's generation status would be defined as second generation if either or both parents were born abroad and the child was born in the U.S

It should be noted that the terms "first" and "second" generation status purely index whether the child was born in the U.S., because according to some (Rumbaut and

Ima 1989), the "first" generation students of the ECLS-K might aptly be termed "one-and-a-half," or according to others, 1.75 generation (Oropesa and Landale 1997; Rumbaut 1997). This term refers to students who arrive in the U.S. during childhood, a particularly formative period of the lifecourse. These one-and-a-half generation children are technically first generation, since they were born abroad, but since much of their early socialization occurs within the American context (since they enter the ECLS-K sample in kindergarten), they may also display characteristics of second generation children. Thus, for simplicity's sake, I use the term "first" generation throughout when referring to the children born abroad, but the reader should note that the experiences of these first generation children should not be equated with those of first generation adults, who truly have a dual frame of reference, as they have more memories from their native country. Kao and Tienda (1995) suggested that it was actually the differences between native and immigrant parents' expectations that influenced child outcomes. Thus, for the current study, the variables for first and second generation are a proxy for recency of *parents'* arrival, rather than the students.'

Region of Residence. Since there may be unmeasured variables correlated with both my variables of interest and the area in which one resides, I accounted for this unobserved heterogeneity using region of residence. This was determined from two sources. First, the ECLS-K fall kindergarten wave provides a census region variable including designations for Northeast, Midwest, West, and South. Further assignment of students to state of residence was determined from restricted-use first-grade state FIPS codes. I control for residence in California, Texas, and Florida, as these states are among those with the largest concentrations of immigrants. Thus, I created residence dummy

variables for Northeast, Midwest, Texas, Florida, (otherwise) South, California, and (otherwise) West.

Family Composition. Family composition was obtained from the fall of kindergarten wave of data collection. The ECLS-K includes a composite measure of whether there are two biological parents in the home, stepparent(s), a single parent, adoptive parents, or other guardian/caretaker(s). I collapsed some categories based on whether statistically significant differences were achieved. This resulted in a final set of dummy variables for: two-parent family (biological or adoptive); stepparent family (one or two stepparents); single-parent family; and other nontraditional structure. Additionally, since household size influences the distribution of household resources, I control for the total number of residents in the household as a continuous variable.

Socioeconomic Variables. I employ three measures of family socioeconomic background. The first variable is the ECLS-K composite socioeconomic status measure created from information collected in the fall of kindergarten. This measure, normally distributed with a mean of zero, incorporates family income, parental educational levels, and occupational status. Hence, composite SES is a comprehensive measure of socioeconomic position. Second, I use a dummy variable collected in the fall of kindergarten indicating whether the family is below the poverty line. Third, I created a measure of the number of cognitively beneficial resources in the home. This is an averaged sum of the child's books and audio materials reportedly owned by the child in the fall of kindergarten. This variable serves as a proxy for parents' orientation to providing an intellectually stimulating home environment, which often reflects socioeconomic status.

Missing Data

As mentioned above, issues with missing data were of special concern. The first issue was that only 2,848 cases of the total 9,758 were administered the OLDS assessment. Moreover, as with most survey data, values on other independent variables were occasionally missing for students included in the analysis. Therefore, I used a multiple imputation procedure, which is suggested as a superior method to listwise or pairwise deletion because it makes use of all available data. I employed the IVEware macro in SAS (Raghunathan, Soleberger, and Van Hoewyk 2000). This procedure produced five data sets, which were then analyzed simultaneously with the appropriate software. This will be discussed further below. (See Appendix Table A for details on variables used in the imputation procedure.)

Concerning imputation of the OLDS, several post-imputation analyses suggested that the imputed values were reliable scores. First, the post-imputation OLDS mean was 8 points higher than the mean for the pre-imputation baseline sample (38.26 versus 30.60). This difference in pre- and post-imputation mean OLDS score is consistent with expectations, since OLDS scores had to be imputed for those students not identified as LM in school records. Second, a means comparison of OLDS scores for LM and non-LM students shows that the non-LM OLDS mean was fourteen points higher, on average, than that for LM students. Third, OLDS scores among non-LM students increased as generation status increased, which was to be expected in view of the positive relationship between English language ability and length of residence in the U.S. However, although imputation provided complete OLDS scores for all cases, the imputed values were

employed only when OLDS was an independent variable and not when it was predicted as the dependent variable in subsequent analyses.

Concerning missing values for other independent variables, the great majority of missing cases had been excluded at random in order to lower data collection costs (NCES 2006), so that random missingness can be assumed (MCAR or MAR). These values were filled in using multiple imputation (Rubin 1987; Allison 2002), as implemented by the program IVEware in SAS. This applied only to independent variables – I did not impute values for the dependent subject-area assessment scores.

Analytic Procedure

The first sets of analyses present population-weighted means and standard deviations for all variables, by groups and by school. Weighted descriptives are presented to provide a picture of the distribution of immigrant groups in the U.S. as a whole. These analyses were performed in SPSS.

Second, I ran weighted multivariate regressions of fifth-grade subject-area performance on relevant background variables, using all cases with test scores for spring of fifth grade. These regressions were conducted in STATA 9.1 using the MICOMBINE procedure with the five imputed data sets created by IVEware in SAS. Additionally, these regressions included corrections for the use of the schools as primary sampling units, so that the sample is clustered by schools (i.e., using the CLUSTER command).

Third, I estimated three-level linear growth models in HLM 6.0. Three-level, hierarchical linear modeling was necessary because of the structure of the data. Student assessments over time are nested within students, which are nested within schools. The usual method of analysis, ordinary least squares (OLS) regression, assumes independence

among observations, and further it assumes normally distributed random errors. However, when observations are clustered, in this case within students and schools, then observations within clusters tend to be more similar on unobserved characteristics than observations chosen at random. This violates the assumption of the independence of errors, since the errors from observations within counties will be correlated. Without accounting for the clustered sample design, standard errors would be biased downward, and statistical significance would be overestimated.

Hierarchical Linear Modeling (using HLM 6.0) provides more robust standard errors and unbiased estimates of relationships because a random component may be added to the intercept. Essentially, this random component allows a separate intercept for each student and school, so that the fixed effect portions of the equations control completely for between-student and between-school differences in the average level of the outcomes. Appropriate design weights were also employed.

Equations Estimated

Analysis I

In the multivariate analytical section presented in Chapter Five, the first set of equations specify the models used to estimate the relationships between Oral Language Development Score (fall kindergarten) and background characteristics.

(3.1) $E(Y) = \beta 0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 Male + \beta_{10} Age + \varepsilon$

(3.2) $E(Y) = \beta_0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 FirstGen + \beta_{10} SecondGen + \varepsilon$

(3.3) $E(Y) = \beta_0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 FirstGen + \beta_{10} SecondGen + \beta_{11} Midwest + \beta_{12} West + \beta_{13} South + \beta_{14} Texas + \beta_{15} California + \beta_{16} Florida + \beta_{17} HHoldSize + \beta_{18} SingleParnt + \beta_{19} StepParnt + \beta_{20} NontradParnt + \beta_{21} CompSES + \beta_{22} Poverty + \beta_{23} CogRes + \beta_{24} Optmsm + \varepsilon$

In these equations, E(Y) refers to OLDS scores, and blocks of variables are added sequentially. Equation 3.1 includes dummies for each ethnic group with white, non-Hispanic as the reference group, gender, and age at assessment. Equation 3.2 additionally includes generation status; equation 3.3 adds region/state, socioeconomic variables, family composition, and the 'immigrant optimism' z-score.

In the second analysis, the same equations are repeated, but where 'immigrant optimism' is the dependent variable:

(3.4) $E(Y) = \beta 0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 Male + \beta_{10} Age + \varepsilon$

(3.5) $E(Y) = \beta_0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 FirstGen + \beta_{10} SecondGen + \varepsilon$

(3.6) $E(Y) = \beta_0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 FirstGen + \beta_{10} SecondGen + \beta_{11} Midwest + \beta_{12} West + \beta_{13} South + \beta_{14} Texas + \beta_{15} California + \beta_{16} Florida + \beta_{17} HHoldSize + \beta_{18} SingleParnt + \beta_{19} StepParnt + \beta_{20} NontradParnt + \beta_{21} CompSES + \beta_{22} Poverty + \beta_{23} CogRes + \beta_{24} OLDS + \varepsilon$

Third, I regressed fifth grade reading IRT scores, sequentially, on all background characteristics as follows:

(3.7) $E(Y) = \beta 0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 Male + \beta_{10} Age + \varepsilon$

(3.8) $E(Y) = \beta_0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 FirstGen + \beta_{10} SecondGen + \varepsilon$

(3.9) $E(Y) = \beta_0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 FirstGen + \beta_{10} SecondGen + \beta_{11} Midwest + \beta_{12} West + \beta_{13} South + \beta_{14} Texas + \beta_{15} California + \beta_{16} Florida + \beta_{17} HholdSize + \beta_{18} SingleParnt + \beta_{19} StepParnt + \beta_{20} NontradParnt + \beta_{21} CompSES + {}_{22} Poverty + \beta_{23} CogRes + \varepsilon$

(3.10) $E(Y) = \beta_0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 FirstGen + \beta_{10} SecondGen + \beta_{11} Midwest + \beta_{12} West + \beta_{13} South + \beta_{14} Texas + \beta_{15} California + \beta_{16} Florida + \beta_{17} HholdSize + \beta_{18} SingleParnt + \beta_{19} StepParnt + \beta_{20} NontradParnt + \beta_{21} CompSES + \beta_{22} Poverty + \beta_{23} CogRes + \beta_{24} OLDS + \varepsilon$

(3.11) $E(Y) = \beta_0 + \beta_1 Mexican + \beta_2 Puerto\ Rican + \beta_3 Cuban + \beta_4 AsnIndian + \beta_5 Chinese + \beta_6 Hispanic + \beta_7 Asian + \beta_8 Black/other + \beta_9 FirstGen + \beta_{10} SecondGen + \beta_{11} Midwest + \beta_{12} West + \beta_{13} South + \beta_{14} Texas + \beta_{15} California + \beta_{16} Florida + \beta_{17} HholdSize + \beta_{18} SingleParnt + \beta_{19} StepParnt + \beta_{20} NontradParnt + \beta_{21} CompSES + \beta_{22} Poverty + \beta_{23} CogRes + \beta_{24} OLDS + \beta_{25} Optmsm + \varepsilon$

Identical calculations were performed for fifth-grade mathematics and science IRT scores.

Analysis IIA

For Chapter Six, I computed linear growth models, first with covariates on the intercept and interacted with the time slope for two-level models (Analysis IIA), and then with school-level contextual characteristics for three-level models (Analysis IIB). Time was measured in one-month units, calculated using exact age-months, where the starting point assessment age in the spring of first grade was centered at the mean. Missing assessment dates were obtained in the multiple imputation procedure as described above.

At both levels I and II, variables are centered about their group means. The following are the equations representing the first set of linear growth models:

(3.12) $E(Y_{itj}) = \pi_{0itj} + \pi_{1itj}(MONTHS) + \varepsilon_{itj}$

where: $\pi_{0itj} = \beta_{00j} + \beta_{01j}Mexican + \beta_{02j}Puerto\ Rican + \beta_{03j}Cuban + \beta_{04j}AsIndian + \beta_{05j}Chinese + \beta_{06j}Hispan + \beta_{07j}Asian + \beta_{08j}Black/oth + \beta_{09j}Male + r_{0ij}$

and: $\pi_{1itj} = \beta_{10j} + \beta_{11j}Mexican + \beta_{12j}Puerto\ Rican + \beta_{13j}Cuban + \beta_{14j}AsIndian + \beta_{15j}Chinese + \beta_{16j}Hispan + \beta_{17j}Asian + \beta_{18j}Black/oth + \beta_{19j}Male$

and: $\beta_{00j} = \gamma_{000} + u_{00}$

and: $\beta_{10j} = \gamma_{100} \ldots \quad \beta_{kj} = \gamma_{k}$

Individual-level covariates were added to the equation in a sequential fashion just as in prior models, which included generation status, socioeconomic variables and family composition, OLDS, and immigrant optimism, so that the final model was represented by the equation:

(3.13) $E(Y_{itj}) = \pi_{0itj} + \pi_{1itj}(MONTHS) + \varepsilon_{itj}$

where: $\pi_{0itj} = \beta_{00j} + \beta_{01j}Mexican + \beta_{02j}Puerto\ Rican + \beta_{03j}Cuban + \beta_{04j}AsIndian + \beta_{05j}Chinese + \beta_{06j}Hispan + \beta_{07j}Asian + \beta_{08j}Black/oth + \beta_{09j}Male +$

β_{010j}FirstGen + β_{011j}SecondGen + β_{012j}Hholdsize + β_{013j}SingleParnt + β_{014j}StepParnt + β_{015j}NontradParnt + β_{016j}CompSES + β_{017j}Poverty + β_{018j}CogRes + β_{019j}OLDS + β_{020j}Optimsm + r_{0ij}

and: $\pi_{1itj} = \beta_{10j} + \beta_{11j}$Mexican + β_{12j}Puerto Rican + β_{13j}Cuban + β_{14j}AsIndian + β_{15j}Chinese + β_{16j}Hispan + β_{17j}Asian + β_{18j}Black/oth + β_{19j}Male+ β_{110j}FirstGen + β_{111j}SecondGen + β_{112j}Hholdsize + β_{113j}SingleParnt + β_{114j}StepParnt + β_{115j}NontradParnt + β_{116j}CompSES + β_{117j}Poverty + β_{118j}CogRes + β_{119j}OLDS + β_{120j}Optimsm

and: $\beta_{00j} = \gamma_{000} + u_{00}$

and: $\beta_{10j} = \gamma_{100}$ … $\beta_{120j} = \gamma_{1200}$

and: E (Y_{itj}) represents growth in reading IRT score from first to fifth grade, employing data from a maximum of three time points (although some students had assessments at only one or two waves): spring of first grade, spring of third grade, and spring of fifth grade. Identical analyses were performed for mathematics achievement growth.

Analysis IIB

Finally, for the contextual models, I added school-level contextual characteristics to the intercepts. The school contextual characteristics are the aggregate of individual-level characteristics as well as ECLS-K-defined measures for each school. The ethnic group concentrations were calculated as the aggregate of individual characteristics at each school, while percentage of free or reduced-price lunch and percent LEP were provided in the ECLS-K dataset. (Missingness on these compositional variables was accommodated in the multiple imputation procedure described above).

I chose to use kindergarten school characteristics for several theoretical and practical reasons. First, prior research suggests that early schooling experiences influence later outcomes, thus, the various school-level factors that may influence early performance retain their relevance throughout the elementary years. Further, many students remained in their kindergarten school throughout elementary school.

A second theoretical reason is that while students may change schools over the course of their education, the characteristics of a new school are unlikely to be drastically different from those at a former school, on average. Background factors such as a change in family socioeconomic status usually determine mobility, e.g., a move to a more affluent neighborhood and school, but such a change in circumstances is unlikely to apply to the vast majority of cases and would not bias results. Finally, from a practical standpoint, it was not possible to account for all school moves over the first five years of school, since some students were not followed to their new school and such characteristics would be unknown. Also, contextual effects could not be computed without a robust number of students at each given school, and in some cases, there was only one student at the new school. Importantly, the effect of student mobility is not a focus of the current study.

The following equation represents the model presented in the analysis of contextual effects on linear growth in reading and mathematics. At level III, I included ethnic concentrations and percentage of LEP students, percentage of students eligible for free or reduced-price lunch, an indicator of average school SES, and state/region.

(3.13) $E(Y_{itj}) = \pi_{0itj} + \pi_{1itj}(MONTHS) + \varepsilon_{itj}$

where: $\pi_{0itj} = \beta_{00j} + \beta_{01j}Mexican + \beta_{02j}Puerto\ Rican + \beta_{03j}Cuban + \beta_{04j}AsIndian +$

$\beta_{05j}Chinese + \beta_{06j}Hispan + \beta_{07j}Asian + \beta_{08j}Black/oth + \beta_{09j}Male +$

$\beta_{010j}FirstGen + \beta_{011j}SecondGen + \beta_{012j}Hholdsize + \beta_{013j}SingleParnt +$

$\beta_{014j}StepParnt + \beta_{015j}NontradParnt + \beta_{016j}CompSES + \beta_{017j}Poverty +$

$\beta_{018j}CogRes + \beta_{019j}OLDS + \beta_{020j}Optimsm + r_{01j}$

and: $\pi_{1itj} = \beta_{10j} + \beta_{11j}\,Mexican + \beta_{12j}Puerto\ Rican + \beta_{13j}Cuban + \beta_{14j}AsIndian +$

$\beta_{15j}Chinese + \beta_{16j}Hispan + \beta_{17j}Asian + \beta_{18j}Black/oth + \beta_{19j}Male +$

$\beta_{110j}FirstGen + \beta_{111j}SecondGen + \beta_{112j}Hholdsize + \beta_{113j}SingleParnt +$

$\beta_{114j}StepParnt + \beta_{115j}NontradParnt + \beta_{116j}CompSES + \beta_{117j}Poverty +$

$\beta_{118j}CogRes + \beta_{119j}OLDS + \beta_{120j}Optimsm$

and: $\beta_{00} = \gamma_{000} + \gamma_{001}\%Mexican + \gamma_{002}\%PRican + \gamma_{003}\%Cuban + \gamma_{004}\%AsIndian +$

$\gamma_{005}\%Chinese + \gamma_{006}\%Hispan + \gamma_{007}\%Asian + \gamma_{008}\%Black/oth +$

$\gamma_{009}\%Freelunch + \gamma_{0010}\%LEP + \gamma_{0011}Texas + \gamma_{0012}California + \gamma_{0013}Florida$

$+ \gamma_{0014}Midwest + \gamma_{0015}West + \gamma_{0016}South + u_{00}$

and $\beta_{01j} = \gamma_{010} \ldots \beta_{020} = \gamma_{0200}$

$\beta_{10j} = \gamma_{100}$

$\beta_{11j} = \gamma_{110} \ldots \beta_{120j} = \gamma_{1200}$

In Equation 3.13, $E(Y_{itj})$ represents growth in reading IRT scores from first to fifth grade. Identical models were calculated for growth in mathematics IRT scores.

CHAPTER FOUR
DESCRIPTIVE RESULTS

This chapter presents descriptive results for the analysis of relationships between immigrant background characteristics and achievement outcomes. First, I present individual-level statistics for the analysis sample selected from the ECLS-K, disaggregated by ethnicity and generation status. Second, I compare characteristics for those schools attended by the analysis sample with the schools in the full ECLS-K data set. For the individual-level descriptives, I begin by presenting demographic and social characteristics, followed by school achievement measures.

Weighted Individual-Level Descriptive Results, by Ethnicity

Weighted means and standard deviations (with unweighted N's) by ethnicity on all social and demographic variables used in subsequent analyses are shown in Table 4.1. The first nine columns show characteristics for each identified ethnic group statistically sensitive to differences in the multivariate analyses. The rows showing the distributions of generation status among ethnic groups shows that among Mexicans, Puerto Ricans, and Cubans, the majority are second generation. However, among unspecified Hispanics, the majority (77%) are third or higher generation. A similar pattern is found among Asian groups, where among Asian Indians and Chinese, the majority are second generation, and among unspecified Asians, a smaller proportion are third or higher generation. I concluded that this results from an increasing tendency over time for ethnic minorities to identify as a pan-ethnic group rather than as the native group that previous generations would have distinguished because of increasing assimilation into a more heterogeneous culture. Among the analysis sample, the majority (75%) are third or

higher generation, while 20 percent are second generation, and approximately 5 percent are first generation immigrants.

Examining the distribution of region, I found substantial variability in the patterns of residential location. Among the entire sample, (last column of Table 4.1), cases were distributed rather evenly across the four primary census categories; however, a greater share lived in California, which is logical considering that a large share of immigrants in general reside in California. Among Mexicans, Chinese, and unspecified Asians, the modal region is California. As would be expected, the modal category for Cubans is Florida, while for Puerto Ricans it is the Northeast, as many Puerto Ricans reside in New York. For unspecified Hispanics, the vast majority lived in California and other Western states. Among non-Hispanics whites, I found a relatively even distribution of residence across the U.S.

Next, concerning family composition characteristics, I found that Asians unspecified, followed by Mexicans, have the greatest number of household members. Other ethnic groups reported around an average of 4.5 members. For parent composition, the group with the greatest proportion of two-parent households was Chinese, followed by Asians unspecified, at around 90 percent. Among the analysis sample, 66 percent lived in two-parent households. A much lower rate was reported by Puerto Ricans (45 percent), Hispanics (57 percent), but especially by Blacks/other minorities at 37 percent. Similarly, Blacks reported the highest rate of single parenthood at 44 percent, followed by Puerto Ricans at 39 percent. The group with the highest level of nontraditional

Table 4.1 Weighted Means and Standard Deviations for Demographic Background Characteristics, by Ethnicity

	Mexican		Puerto Rican		Cuban		Asian Indian		Chinese	
	M	SD	M	SD	M	SD	M	SD	M	SD
Male	0.53	0.50	0.53	0.50	0.59	0.49	0.42	0.49	0.53	0.50
First Gen	0.08	0.27	0.07	0.25	0.11	0.32	0.17	0.38	0.08	0.27
Second Gen	0.57	0.50	0.37	0.48	0.54	0.50	0.73	0.45	0.71	0.46
Third or higher Gen	0.35	0.48	0.56	0.50	0.34	0.48	0.10	0.31	0.21	0.41
Texas	0.24	0.43	0.02	0.13	0.00	0.00	0.02	0.14	0.01	0.09
California	0.46	0.50	0.01	0.11	0.02	0.13	0.19	0.39	0.43	0.50
Florida	0.01	0.12	0.19	0.39	0.78	0.42	0.10	0.30	0.04	0.19
Northeast	0.02	0.13	0.53	0.50	0.16	0.36	0.38	0.49	0.18	0.38
Midwest	0.08	0.27	0.15	0.35	0.01	0.09	0.22	0.42	0.17	0.38
West (otherwise)	0.15	0.35	0.03	0.18	0.00	0.00	0.01	0.11	0.08	0.27
South (otherwise)	0.04	0.20	0.08	0.27	0.04	0.20	0.08	0.28	0.09	0.29
Household Size	5.12	1.59	4.37	1.36	4.21	1.24	4.63	1.12	4.23	1.13
Two Parents	0.75	0.43	0.45	0.50	0.69	0.46	0.87	0.34	0.91	0.29
Single Parent	0.17	0.37	0.39	0.49	0.16	0.37	0.04	0.19	0.06	0.24
Stepparent(s)	0.06	0.24	0.11	0.31	0.07	0.26	0.02	0.12	0.02	0.14
Nontraditional Structure	0.02	0.13	0.05	0.22	0.07	0.26	0.08	0.27	0.01	0.09
Composite SES	-0.60	0.63	-0.30	0.52	0.19	0.80	0.57	1.03	0.50	0.91
Poverty Status	0.42	0.49	0.36	0.48	0.19	0.40	0.11	0.31	0.07	0.26
# Cognitive Resources	20.83	24.05	27.64	24.40	31.02	25.82	27.20	21.54	42.31	32.02
Optimism Z-score	0.00	0.77	-0.16	0.80	0.35	0.71	0.45	0.69	0.36	0.70
N	1,372		161		70		115		142	

Table 4.1 Continued

	Hispanic Unspecified		Asian Unspecified		White Non-Hispanic		Black/ Other Minority		Total Analysis Sample	
	M	SD	M	SD	M	SD	M	SD	M	SD
Male	0.48	0.50	0.53	0.50	0.51	0.50	0.50	0.50	0.51	0.50
First Gen	0.08	0.27	0.11	0.31	0.02	0.14	0.02	0.13	0.05	0.21
Second Gen	0.15	0.36	0.46	0.50	0.05	0.23	0.08	0.26	0.20	0.40
Third or higher Gen	0.77	0.42	0.43	0.50	0.93	0.26	0.91	0.29	0.75	0.43
Texas	0.05	0.22	0.02	0.12	0.04	0.20	0.06	0.24	0.08	0.27
California	0.18	0.39	0.32	0.47	0.11	0.31	0.11	0.31	0.19	0.40
Florida	0.06	0.24	0.01	0.10	0.07	0.25	0.06	0.23	0.06	0.24
Northeast	0.21	0.41	0.15	0.36	0.21	0.41	0.23	0.42	0.18	0.39
Midwest	0.09	0.28	0.15	0.36	0.21	0.41	0.17	0.37	0.15	0.36
West (otherwise)	0.28	0.45	0.26	0.44	0.15	0.35	0.09	0.28	0.16	0.37
South (otherwise)	0.13	0.34	0.09	0.28	0.22	0.42	0.29	0.45	0.17	0.38
Household Size	4.74	1.57	5.19	1.96	4.43	1.23	4.55	1.53	4.66	1.48
Two Parents	0.57	0.50	0.82	0.38	0.74	0.44	0.37	0.48	0.66	0.48
Single Parent	0.30	0.46	0.12	0.33	0.15	0.36	0.44	0.50	0.23	0.42
Stepparent(s)	0.10	0.30	0.04	0.19	0.09	0.28	0.10	0.30	0.08	0.28
Nontraditional Structure	0.03	0.17	0.02	0.13	0.02	0.14	0.10	0.30	0.04	0.18
Composite SES	-0.47	0.72	0.02	0.79	0.23	0.75	0.02	0.79	-0.13	0.80
Poverty Status	0.36	0.48	0.24	0.43	0.10	0.30	0.24	0.43	0.24	0.43
# Cognitive Resources	25.03	25.94	27.73	25.00	55.31	34.67	29.02	26.48	37.66	33.10
Optimism Z-score	0.01	0.75	0.15	0.69	-0.02	0.71	-0.13	0.78	-0.02	0.74
N	1,563		1,219		3,596		1,520		9,758	

family structure, indicating that a non-parent guardian or other relative was head of the household, was Blacks/other minorities (10 percent) followed by Asian Indians (8 percent).

Next, I examined the distributions of the socioeconomic variables. Mexicans reported the lowest composite SES, which is a scale of family income, parental educational level and occupational status, at -.60, followed by Hispanics unspecified at -.47. (Recall that this variable is centered at zero.) The groups with the highest reported composite SES were Asian Indians (.57) and Chinese (.50). Although I expected to find that Whites had the highest SES, Whites' SES was relatively modest at .22. That Indians and Chinese likely have the highest SES may indicate that the most educated and those with the highest levels of financial capital are able to migrate to the U.S.

The group with the greatest proportion living below the poverty line was Mexicans, at 42 percent. Those with the lowest rate of poverty were Chinese, followed by Asian Indians, which corresponds with reported composite SES. Examining cognitive resources, I found that although Whites did not have the highest SES or lowest rates of poverty, they reported the highest number of cognitively beneficial resources in the home at 55.31, where the mean for the analysis sample was 37.66. The lowest number was reported by Mexicans at 20.83.

In subsequent analyses, I examine predictors of the Optimism Z-score, measuring "immigrant optimism." In the raw weighted means, I found that Asian Indians reported the highest level of optimism (.45), followed by Chinese (.36). The group with the lowest level of optimism was Puerto Ricans (-.16) followed by Blacks (-.13).

In Table 4.2, I report school performance-related measures by ethnic group. The first measure is the dichotomous indicator of language minority status. Recall that this variable included students identified as LM in their school records as well as students identified by ECLS-K using questions in the parent questionnaire in the fall of kindergarten. The group with the highest reported rate of having a primary home language that was non-English was Cubans at 80 percent, followed by Asians unspecified and Chinese at 76 percent, and Mexicans at 74 percent. The group with the lowest rate of being LM was Whites and Blacks, both at only 7 percent.

Concerning the English Oral Language Development Score, I found that Whites had the highest scores at 44.48. The "passing" score on the OLDS was 37, which meant that a student could be routed to the subject assessments administered in English. The second-highest score was achieved by Blacks (42.87), followed by Asian Indians (41.97). These scores are logical considering that the majority of the whites and Blacks in the analysis sample are third or higher generation, and since English is an official language of the country of India. The lowest OLDS scores were achieved by Mexicans at 26.17, which falls far below the cutoff score of 37. On average, Mexicans, unspecified Asians, and unspecified Hispanics received non-passing scores on the OLDS.

Next I report the weighted average reading and mathematics IRT scores for each assessment at three time points. Examining the reading scores for the spring of first grade, I found that Mexicans had the lowest starting scores at 62.78, followed by Puerto Ricans (63.99) and Hispanics (64.49). These starting points in reading achievement have important implications for rates of growth that will be achieved through the elementary

Table 4.2 Weighted Means and Standard Deviations for School-Related Variables, by Ethnicity

	Mexican		Puerto Rican		Cuban		Asian Indian		Chinese	
	M	SD	M	SD	M	SD	M	SD	M	SD
Language Minority	0.74	0.44	0.58	0.49	0.80	0.40	0.73	0.44	0.76	0.43
Age at Assessment-fall K	67.52	4.37	68.07	4.23	68.81	3.55	67.17	4.09	67.49	3.77
Oral Language Dev Score - fall Kinder (OLDS)	26.17	17.86	40.19	13.35	40.34	12.81	41.97	10.59	41.08	14.45
IRT Scores:										
Reading– spring 1st grade	62.78	19.14	63.99	18.36	69.81	19.41	83.49	24.61	88.55	22.16
Reading– spring 3rd grade	103.60	24.36	110.74	23.93	126.92	19.25	127.61	19.62	130.17	19.91
Reading– spring 5th grade	126.24	22.42	134.16	21.54	142.55	19.80	148.02	17.28	150.28	19.26
Math – spring 1st grade	51.31	14.12	51.05	15.11	59.92	18.07	60.83	15.21	68.08	18.11
Math – spring 3rd grade	83.41	20.23	85.10	22.09	95.42	21.26	100.80	17.79	107.91	17.83
Math – spring 5th grade	105.42	20.76	107.93	21.47	115.82	20.91	124.37	15.97	129.71	16.25
Science – spring 5th grade	49.20	13.75	52.28	13.91	58.93	12.76	62.71	12.38	65.95	11.93
N	1,372		161		70		115		142	

Table 4.2 Continued

	Hispanic Unspecified		Asian Unspecified		White Non-Hispanic		Black/Other Minority		Total Analysis Sample	
	M	SD	M	SD	M	SD	M	SD	M	SD
Language Minority	0.66	0.48	0.76	0.43	0.07	0.26	0.07	0.25	0.34	0.47
Age at Assessment-fall K	67.73	4.23	67.25	4.21	68.58	4.40	67.97	4.34	68.06	4.36
Oral Language Dev Score - fall Kinder (OLDS)	33.27	16.89	36.19	13.34	44.48	10.80	42.87	11.19	38.65	15.32
IRT Scores										
Reading– spring 1st grade	64.49	20.11	71.86	22.35	76.27	21.58	65.64	20.51	70.25	21.72
Reading– spring 3rd grade	108.14	23.46	113.89	23.41	125.15	23.16	108.81	23.79	115.16	25.32
Reading– spring 5th grade	130.87	21.71	135.57	22.80	145.82	20.96	128.71	23.80	136.49	23.49
Math – spring 1st grade	51.70	14.72	54.72	15.25	62.47	16.73	50.88	13.90	56.42	16.40
Math – spring 3rd grade	84.79	20.42	90.49	21.33	99.04	19.78	82.73	21.14	90.90	21.63
Math – spring 5th grade	107.32	21.42	114.75	20.81	119.89	19.42	103.39	22.34	112.49	21.69
Science – spring 5th grade	50.79	13.41	53.06	14.94	62.28	12.17	49.26	14.07	55.47	14.53
N	1,563		1,219		3,596		1,520		9,758	

years. Correspondingly, Mexicans had the lowest reading scores in the fifth grade (126.24), while Chinese students' average fifth grade score was the highest at 150.28 and the highest starting point of all groups at 39.98.

Similar patterns were noted for mathematics IRT scores. Fifth grade scores were, on average, the lowest among Blacks/other minority students (50.88) followed by Puerto Rican (51.05) and Mexican students (51.31). The highest average math scores in the fifth grade were demonstrated by Chinese students at 129.71, while the average math score for the entire analysis sample was 112.49. Fifth grade science scores showed the same patterns, where the lowest scores were found among Blacks (49.26) and Mexicans (49.20), while the highest scores were achieved by Chinese (65.95). In subsequent multivariate analyses, I will attempt to discover whether the same patterns can be found in fifth grade achievement and elementary school growth rates while controlling for correlated factors.

Weighted Individual-Level Descriptive Results, by Generation Status

In Table 4.3, I present the same weighted means and standard deviations disaggregated by generation status. Important to note are the distributions of ethnic groups by generation. I found that among the first generation, this group is primarily composed of Mexicans and Unspecified Hispanics (29 and 26 percent, respectively). Also, 18 percent of the first generation students were identified as non-Hispanic whites. Among the second generation, I found that the vast majority were Mexican (49 percent), followed by unspecified Asians (13 percent) and Whites (11 percent). Among the third or higher generation students, 50 percent were white, 20 percent are Black, followed by unspecified Hispanics (16 percent). Importantly, this distribution is similar to that for the

Table 4.3 Weighted Means and Standard Deviations for All Analysis Variables, by Generation Status

	First Generation		Second Generation		Third or higher Generation		Total Analysis Sample	
	M	SD	M	SD	M	SD	M	SD
Male	0.50	0.50	0.52	0.50	0.51	0.50	0.51	0.50
Mexican	0.29	0.45	0.49	0.50	0.08	0.27	0.17	0.38
Puerto Rican	0.03	0.16	0.03	0.18	0.01	0.12	0.02	0.36
Cuban	0.02	0.13	0.02	0.14	0.00	0.06	0.01	0.09
Asian Indian	0.03	0.16	0.03	0.16	0.00	0.03	0.01	0.08
Chinese	0.01	0.10	0.02	0.15	0.00	0.04	0.01	0.08
Hispanic, Unspecified	0.26	0.44	0.12	0.32	0.16	0.37	0.16	0.36
Asian, Unspecified	0.13	0.34	0.13	0.33	0.03	0.18	0.06	0.23
White, non-Hispanic	0.18	0.38	0.11	0.31	0.50	0.50	0.41	0.49
Black/Other Minority	0.06	0.24	0.06	0.24	0.20	0.40	0.17	0.37
Texas	0.07	0.26	0.12	0.33	0.07	0.25	0.08	0.27
California	0.17	0.37	0.37	0.48	0.15	0.35	0.19	0.40
Florida	0.08	0.28	0.07	0.25	0.06	0.23	0.06	0.24
Northeast	0.15	0.35	0.19	0.39	0.18	0.39	0.18	0.39
Midwest	0.11	0.31	0.10	0.30	0.17	0.38	0.15	0.36
West (otherwise)	0.22	0.41	0.09	0.28	0.18	0.38	0.16	0.37
South (otherwise)	0.21	0.41	0.06	0.25	0.20	0.40	0.17	0.38
Household Size	4.94	1.66	4.95	1.61	4.56	1.42	4.66	1.48
Two Parents	0.76	0.43	0.78	0.42	0.62	0.49	0.66	0.48
Single Parent	0.16	0.36	0.16	0.37	0.25	0.43	0.23	0.42
Stepparent(s)	0.06	0.23	0.04	0.21	0.09	0.29	0.08	0.28
Nontraditional Structure	0.03	0.17	0.02	0.14	0.04	0.19	0.04	0.18
Composite SES	-0.25	0.85	-0.36	0.81	-0.06	0.78	-0.13	0.80
Poverty Status	0.44	0.50	0.35	0.48	0.20	0.40	0.24	0.43
# Cognitive Resources	21.92	25.42	22.37	24.25	42.82	34.00	37.66	33.10
Optimism Z-score	0.11	0.72	0.16	0.73	-0.07	0.74	-0.02	0.74
N	464		2,118		7,176		9,758	

Table 4.3 Continued

	First Generation		Second Generation		Third or higher Generation		Total Analysis Sample	
	M	SD	M	SD	M	SD	M	SD
Language Minority	0.86	0.35	0.83	0.38	0.18	0.38	0.34	0.47
Age at Assessment-fall K	68.67	4.53	67.43	4.21	68.20	4.37	68.06	4.36
Oral Language Dev Score - fall Kinder (OLDS)	25.94	18.81	30.84	18.03	41.58	12.93	38.65	15.32
IRT Scores:								
Reading– spring 1st grade	66.14	21.75	67.00	21.26	71.77	21.72	70.25	21.72
Reading– spring 3rd grade	109.75	26.48	109.06	25.17	118.11	24.78	115.16	25.32
Reading– spring 5th grade	133.64	23.89	131.00	23.20	139.03	23.16	136.49	23.49
Math – spring 1st grade	52.73	15.35	52.69	15.01	58.29	16.73	56.42	16.40
Math – spring 3rd grade	87.52	21.12	86.74	21.33	92.90	21.51	90.90	21.63
Math – spring 5th grade	109.72	22.56	109.55	21.79	113.94	21.44	112.49	21.69
Science – spring 5th grade	53.73	15.54	51.17	14.67	57.42	13.98	55.47	14.53
N	464		2,118		7,176		9,758	

U.S. as a whole, indicating that the third or higher generation students represent a cross section of American students, which serves as the reference group in later analyses.

The distributions for region of residence also followed expected patterns. First, among the first generation students, the majority were located in the West, South, and in California, which is logical considering the arrival points of many immigrant groups. Among the second generation, the majority, 37 percent, resided in California. Students in the third or higher generation group were distributed rather evenly across all regions and states, which also resembled the distribution for the whole analysis sample.

Regarding the family composition variables in Table 4.3, I found that the first and second generation students were more likely to be found in two-parent families than third or higher generation students. Also, more third generation students were reportedly living in single-parent homes. Concerning SES, the lowest SES was reported by second generation families (-.36) followed by first generation (-.25). While it might have been expected that newer arrivals to the U.S. would have the lowest SES, it was actually the later arrivals in this position. This is likely due to the fact that this composite SES measure also captured occupational status, and among the second generation, there are often families who work in low-paid unskilled service industries and within ethnic enclaves. Accordingly, I did find that the group with the highest poverty rate was the first generation at 44 percent, compared to the total analysis sample average of 24 percent. As expected, the greatest number of cognitively beneficial resources was reported by the third generation families. Interestingly, I also found among these averages, that second, followed by first generation students, had the highest levels on the

optimism z-score. Whether these differences translate into higher 'immigrant optimism,' net other background factors, will be explored in the following chapter.

Next, in the second panel of Table 4.3, I present weighted distributions on school achievement variables across generation groups. As expected, the highest proportion of LM students was found among the first generation. Also, as the literature has suggested would be the case, there were a substantial number of third or higher generation students who were identified as LM, at 18 percent. This is a result of certain immigrant groups' relative isolation in language-minority enclaves, or alternatively, it is because ethnic minority groups with high number of recent immigrants in the schools are often labeled as LM by school administrators, regardless of actual English ability. Also, it is possible that third or higher generation immigrant students can speak English, but have limited academic English skills in reading and writing.

The OLDS scores followed an expected distribution with third or higher generation students achieving a score that is above the "passing" score of 37 at 41.58, while first and second generation students scored well below this level. The patterns for reading and mathematics IRT scores also followed a linear pattern with lower starting points found for first and second generation students, as well as lower ending points in the fifth grade. Similar growth patterns are expected in the multivariate analyses.

Weighted School-Level Descriptive Results

Table 4.4 presents weighted means and standard deviations for school-level characteristics, for both the analysis sample and the full ECLS-K baseline sample. As explained in Chapter Three, I used language minority status to select immigrant students

Table 4.4 Weighted Means and Standard Deviations of School Characteristics, fall Kindergarten for Analysis Sample Schools and Full ECLS-K Sample

	Analysis Sample Schools		Total ECLS-K Schools	
	Mean	SD	Mean	SD
Percent Free/Reduced-Price Lunch	38.85	26.68	35.37	31.35
Percent "Limited English Proficient"	17.32	20.50	8.60	16.11
Percent Minority	52.41	32.68	38.29	34.36
Percent Mexican	14.91	20.24	7.57	15.26
Percent Puerto Rican	1.66	4.33	1.00	3.25
Percent Cuban	0.64	4.58	0.33	3.10
Percent Asian Indian	0.97	3.03	0.64	2.34
Percent Chinese	1.02	3.51	0.67	2.65
Percent Hispanic, unspecified	15.60	14.16	8.93	12.03
Percent Asian, unspecified	10.08	14.32	5.50	11.31
Percent White, non-Hispanic	38.80	30.31	55.64	33.95
Percent Black/other minority	16.33	21.09	19.73	27.07
Mean Oral Lang Dev Score – fall K	38.51	8.52	41.53	6.74
Mean IRT Scores:				
Reading– fall Kinder	28.71	5.24	29.29	5.32
Reading– spring Kinder	40.25	7.16	40.83	7.45
Reading– fall 1st grade	46.50	8.50	47.78	9.37
Reading– spring 1st grade	69.40	11.54	71.22	12.33
Reading– spring 3rd grade	114.19	13.96	117.09	14.24
Reading– spring 5th grade	135.61	13.10	138.12	13.32
Math– fall Kinder	21.70	4.98	22.83	5.03
Math– spring Kinder	31.85	6.51	33.17	6.48
Math– fall 1st grade	38.60	7.16	40.41	7.82
Math – spring 1st grade	55.73	8.69	57.34	9.06
Math – spring 3rd grade	90.31	11.59	91.83	12.07
Math – spring 5th grade	111.97	11.49	112.96	12.11
N of schools	618		1,018	

and all the students the ECLS-K sampled from their respective schools. This resulted in the retention of 618 schools from the fall kindergarten wave out of 1,018 possible schools. [Note: Missing data on independent variables was imputed separately for the full ECLS-K sample.] I began by examining the concentrations of characteristics that prior research has found influential in student achievement.

First, I found that students in the analysis sample attended schools with slightly higher concentrations of students eligible for free or reduced-price lunches.[2] Second, as was expected, there was double the concentration of students identified as "limited English Proficient" in the analysis sample schools (17.32 versus 8.60). Next, I examined the ethnic concentrations in immigrant schools compared to the baseline ECLS-K sample.

Overall, there was a significantly higher proportion of minority students among the analysis sample than among the full sample (52.41 versus 38.29). Correspondingly, Mexicans were twice as concentrated in the analysis sample as in schools in the full ECLS-K sample, as were unspecified Hispanics and Asians. The analysis sample schools had fewer non-Hispanic whites than in the full sample, as well. There were similar concentrations of Blacks among both the analysis and full samples.

Examining average achievement levels, I found that while the average OLDS score among the analysis sample schools was slightly above the "pass" line of 37.00, it was still somewhat lower than for the full ECLS-K sample (38.51 versus 41.53). Next, I examined average achievement rates for reading, from fall of kindergarten through the spring of fifth grade. While the differences are not large, I found that the average scores, at each time point, were lower in the schools attended by the analysis sample as

[2] Families with children eligible for free or reduced-price school lunch typically have annual income, respectively, around 1.8 and 1.3 times the federal poverty level, which in year 2000 was $17,050 for a family of four (U.S. Department of Agriculture; U.S. Department of Health and Human Services).

compared to the entire ECLS-K sample. The same pattern was found for average math scores. In the following chapters, I explore whether these patterns persist after controlling for all relevant background factors.

CHAPTER FIVE
MULTIVARIATE REGRESSION OF FIFTH GRADE ACHIEVEMENT OUTCOMES

In this chapter, I explore the relationships between immigrant background characteristics and fifth grade achievement outcomes in reading, mathematics, and science. As mentioned, fifth grade is a particularly important point in students' educational trajectories. Fifth-grade achievement is dependent upon prior educational accomplishments (Dauber, Alexander, and Entwisle 1996), and it marks a transition from more rudimentary grade-school learning to the increased expectations of middle school. Students' performance in these middle grades often determines whether they make requisite coursework for later high school courses in math and science, and such coursework indicates how students will be located along the occupational structure, since advanced courses in math and science may determine either a college preparatory or vocational track.

The research questions addressed in this chapter also include the following. First, what is the relationship between immigrant background characteristics and English oral language skills (measured using the OLDS assessment) when students begin kindergarten? Second, is there evidence of immigrant optimism among more recent arrivals to the U.S.? Finally, what are the relationships between fifth grade reading, math, and science and immigrant background characteristics, including early English oral language ability and immigrant optimism?

First, I hypothesize that Hispanics, particularly Mexicans, will begin school with relatively weaker English skills than ethnic majority groups. Due to segregation and the high density of Hispanics in some areas, these students are more susceptible to linguistic isolation. Second, I predict that first and second generation immigrant students will

display more optimistic behaviors regarding schoolwork, as the 'immigrant optimism' hypothesis proposes. Third, I predict that first and second generation students will have higher performance in reading, math, and science; related to this, I also expect that this relationship will be evident once immigrant students' relatively lower SES and English ability are controlled.

The Sample

Of the analysis sample of N = 9,758 students, only 5,097 had a complete set of test scores at age 10, when most were in fifth grade. The great majority of missing cases were excluded at random in order to lower data collection costs (NCES 2006). However, some were lost due because they did not have assessments at age 10. The first two columns of Table 5.1 compare the unweighted means and distributions for the baseline sample and the analysis sample persisting until age 10, after missing independent variables were imputed using multiple imputation in SAS IVEware. Fortunately, these are similar on variables of particular concern in the analyses, including generation, ethnicity, family structure and SES. I concluded that non-random sample attrition is unlikely to introduce a major source of bias into the study.

Column 3 of Table 5.1 presents weighted means and standard deviations for all variables used in the current analysis among the analysis sample age-10 persisters. Five percent are first generation, 29 percent are second generation, while about 67 percent are either third or higher generation status. While 41 percent are white students, approximately 23 percent identify as Mexican, 12 percent are Hispanic but further unspecified, 6 percent are Asian unspecified, while 12 percent are black or some other

minority. Almost a quarter of the analysis sample resided in California, and nearly a quarter live below the poverty line.

Table 5.1 Means and Standard Deviations Comparing the Baseline Sample and 10-Year-Old Persisters (With Multiple Imputation) for All Analysis Variables

	Unweighted Baseline Sample, n=9758		Unweighted Age 10 Persisting Sample, n=5097		Weighted Age 10 Persisting Sample, N=5,097	
	Mean	(SD)	Mean	(SD)	Mean	(SD)
Age at Assessment (mo)	67.97	4.45	67.92	4.29	68.01	4.26
Male	0.51	0.50	0.50	0.50	0.50	0.50
First Generation	0.05	0.21	0.05	0.21	0.05	0.21
Second Generation	0.22	0.41	0.31	0.46	0.29	0.45
Third-and-higher Generation	0.74	0.44	0.64	0.48	0.67	0.47
Mexican	0.14	0.35	0.20	0.40	0.23	0.42
Puerto Rican	0.02	0.13	0.02	0.14	0.02	0.14
Cuban	0.01	0.08	0.01	0.10	0.01	0.10
Asian Indian	0.01	0.08	0.02	0.13	0.01	0.10
Chinese	0.01	0.11	0.02	0.15	0.01	0.09
Hispanic, not spec	0.16	0.37	0.12	0.33	0.12	0.33
Asian/PI, not spec	0.13	0.33	0.13	0.34	0.06	0.24
White, non-Hispanic	0.37	0.48	0.37	0.48	0.41	0.49
Black/Other Minority	0.16	0.36	0.13	0.32	0.12	0.33
Texas	0.06	0.24	0.08	0.27	0.09	0.29
California	0.20	0.40	0.26	0.44	0.24	0.43
Florida	0.05	0.23	0.06	0.24	0.07	0.25
Northeast	0.18	0.38	0.18	0.38	0.19	0.39
Midwest	0.17	0.37	0.18	0.38	0.16	0.36
West	0.17	0.38	0.12	0.32	0.12	0.32
South	0.16	0.37	0.13	0.33	0.15	0.36
Household Size	4.69	1.53	4.74	1.53	4.68	1.47
Two Parents	0.67	0.47	0.73	0.44	0.72	0.45
Single Parent	0.22	0.41	0.19	0.39	0.19	0.39
Stepparent(s)	0.07	0.26	0.05	0.22	0.06	0.24
Nontraditional	0.03	0.18	0.03	0.17	0.03	0.17
Composite SES	-0.09	0.82	-0.05	0.83	-0.08	0.82
Below Poverty Level	0.23	0.42	0.23	0.42	0.23	0.42
# of Cognitive Resources	37.73	32.07	38.70	33.02	38.88	33.76
Oral Language Dev Score	38.42	15.30	38.11	15.72	38.45	15.74
Optimism Z-socre (fall k)	0.00	0.74	0.06	0.71	0.05	0.72
Fifth Grade Reading IRT[a]	136.92	23.59	136.94	23.57	136.49	23.49
Fifth Grade Math IRT[a]	112.91	21.77	112.98	21.71	112.56	21.63
Fifth Grade Science IRT[a]	55.37	14.75	55.39	14.74	55.51	14.50

Note. Totals for sets of dummy variables may not sum exactly to 100% due to rounding.
[a] Dependent Variables not imputed.

Determinants of Kindergarten English Oral Language Ability

Table 5.2 presents the results of regressions of students' English OLDS scores when the students enter kindergarten. Here, as in all regressions, appropriate design weights were employed, and the sample was restricted to those students who had complete test scores five years later, at age 10. The first column shows overall ethnic group differentials. Mexicans were found to be the most linguistically disadvantaged, followed by unspecified Hispanics, unspecified Asians, and Cubans. On this basic test of English proficiency, Puerto Ricans, Asian Indians, Chinese, and Black students displayed skills comparable to whites.

The second column adds generation status to the regression. As expected, first generation students had the weakest reading skills, followed in sequence by second and third-and-higher generation students. The final column of this table adds region, family structure, and the socioeconomic variables to the equation. Among the coefficients for region/state, I found that students in Texas and California performed lower on the OLDS than students in the Northeast. Household structure had little net effect on language skill. However, the composite SES variable had extremely large and positive effects, while poverty status was strongly negative. I also found that the reported number of cognitively beneficial resources in the home had a positive relationship with English language development, primarily because this variable measured the number of books and audio materials the child owned. Together these socioeconomic variable results suggest that parents with more human and financial capital are able to provide home environments more conducive to strong language development. With these variables

Table 5.2 Oral Language Development Scale (fall kindergarten) Regressed on Demographic Background Characteristics, n=5,097

	Model 1	Model 2	Model 3
Intercept	-7.00	-9.43	0.94
Male=1	-0.32	-0.32	0.69
Mexican [a]	-21.78***	-20.84***	-6.88**
Puerto Rican	-0.18	-0.58	3.19
Cuban	-6.29^	-5.99*	-3.79
Indian (Asian)	-2.52	-0.49	-1.40
Chinese	-2.85	-1.63	-0.08
Hispanic (not specified)	-11.73***	-12.46***	-4.53*
Asian/PI (not specified)	-8.56***	-8.35***	-1.56
Black/Other Minority	-0.27	-0.82	2.31
First Generation[b]		-13.48***	-11.87***
Second Generation		-4.67***	-4.03***
Texas[c]			-6.83*
California			-6.84**
Florida			0.47
Midwest			-0.91
West			-0.69
South			0.41
Household Size			-0.48
Stepparent(s)[d]			1.06
Single parent			2.05
Nontraditional structure			1.90
Socioeconomic status			5.01***
Below Poverty Level			-4.03**
# Cognitive resources			.14***
Optimism Z-score			1.49*
R-square	.22	.26	.40

*** p<.001 **p<.01 *p<.05 ^p<.10

Note. Also includes a control for age at assessment. [a] Ref group is White, non-Hispanic. [b] Ref group is third-and-higher generation. [c] Ref group is Northeast. [d] Ref group is two parents.

added to the equation, the negative effects for Mexicans, Cubans, and unspecified Hispanics and Asians were sharply reduced, suggesting that their English disadvantage was largely related to social class background. Even with controls for the socioeconomic variables, first generation students had the weakest oral English language skills. Second generation students are next in order, with the third-and-higher generation showing the strongest skills.

Determinants of Immigrant Optimism

Table 5.3 presents regressions predicting the Optimism Z-score, which is an averaged sum of parental expectations and student levels of effort as judged by their teachers in the fall of kindergarten, when students were just beginning formal schooling. Males scored higher on the immigrant optimism measure than females, while among all ethnic groups, Asian Indians and Chinese scored highest.

The second column of this table adds generation to the equation. Importantly, first and second generation students (and their parents) were found to have greater school-related optimism and effort than those from the third-and-higher generation. With generation controlled, the positive optimism effects for Asian Indian and Chinese students were reduced.

Model 3 adds the geographic, household composition, and socioeconomic variables to the equation. Socioeconomic status and two-parent households were strongly and positively related to optimism. Once these variables were controlled, the first and second generation effects on optimism became even larger. These results provide preliminary evidence in support of the immigrant optimism hypothesis. Further, Mexicans, unspecified Hispanics and Asians emerged as having higher school-

Table 5.3. Optimism Z-score (fall kindergarten) Regressed on Social and Demographic Background Characteristics, n=5,097

	Model 1	Model 2	Model 3
Intercept	-1.09	-1.13	-1.41
Male=1	-0.19***	-0.19***	-0.19***
Mexican [a]	0.02	-0.11*	0.22***
Puerto Rican	-0.06	-0.15	0.01
Cuban	0.28^	0.15	0.21
Indian (Asian)	0.50***	0.32**	0.27*
Chinese	0.31**	0.15	0.11
Hispanic (not specified)	0.06	0.01	0.24***
Asian/PI (not specified)	0.11*	-0.02	0.14**
Black/Other Minority	-0.10^	-0.11*	0.10^
First Generation[b]		0.18*	0.29***
Second Generation		0.22***	0.25***
Texas[c]			-0.12^
California			0.01
Florida			0.00
Midwest			-0.05
West			-0.15**
South			-0.05**
Household Size			-0.02^
Stepparent(s)[d]			-0.14*
Single parent			-0.10**
Nontraditional structure			-0.23**
Socioeconomic status			0.18***
Below Poverty Level			-0.05
# Cognitive resources			0.00***
OLDS (fall K)			0.00**
R-square	.04	.05	.14

*** p<.001 **p<.01 *p<.05 ^p<.10

Note. Also includes a control for age at assessment. [a] Ref group is White, non-Hispanic. [b] Ref group is third-and-higher generation. [c] Ref group is Northeast. [d] Ref group is two parents.

related optimism than Whites with the vector of region, family composition and socioeconomic controls. The positive coefficient for SES and number of cognitive resources also implies that being lower SES imparts lower levels of optimism. Since minority groups have relatively lower SES compared to whites, holding financial resources for all ethnic groups equal, these minority groups had higher levels of optimism than whites.

Fifth Grade Reading Achievement

Table 5.4 shows regressions to predict reading scores when the students were 10 yeas of age. The first model includes only age, gender and ethnicity as controls. Consistent with prior research, elementary school males read less well than females. Regarding ethnicity, Mexicans, Puerto Ricans, unspecified Hispanics, unspecified Asians, and Blacks performed significantly lower than non-Hispanic Whites. Further, I found that Asian Indians and Chinese showed statistically significant advantages over Whites in reading.

The second column adds generation status to the model. Without further controls, there were no significant generational differences in reading, nor did controls for generation status substantially alter ethnic differences in reading, suggesting that ethnic differences in reading achievement were not related to time spent in the U.S.

The third column of Table 5.4 adds region, family structure, and the socioeconomic variables to the model. The family structure and socioeconomic variables affected reading in expected ways, so that students from higher-SES homes demonstrated significantly higher reading performance. A standard deviation increase in SES translated into over one-third of a standard deviation increase in reading test scores.

Table 5.4. Reading IRT Scores at Age 10 Regressed on Demographic Background Characteristics, Kindergarten English Language Ability, and Immigrant Optimism, n=5,097

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	125.91	126.42	126.37	121.03	131.07
Male=1	-2.32**	-2.32**	-2.20**	-2.19**	-0.82
Mexican[a]	-19.12***	-18.41***	-6.41***	-4.37**	-5.94***
Puerto Rican	-11.52***	-11.06***	-4.57*	-5.22*	-5.30*
Cuban	-3.16	-2.46	-2.22	-1.78	-3.26
Indian (Asian)	2.46	3.42	1.36	0.74	-1.30
Chinese	4.85*	5.74**	3.72^	3.39^	2.60
Hispanic (not specified)	-14.78***	-14.48***	-5.39***	-4.49***	-6.22***
Asian/PI (not specified)	-9.83***	-9.14***	-2.71	-2.60	-3.56*
Black/Other minority	-16.92***	-16.86***	-8.11***	-8.97***	-9.68***
First Generation[b]		0.01	3.91*	6.95***	4.90**
Second Generation		-1.36	0.74	1.82*	.04
Texas[c]			0.92	2.34	3.20^
California			-0.39	-.70	0.66
Florida			3.06^	2.77	2.75
Midwest			-0.68	-0.86	-0.51
West			-1.27	-0.99	0.10
South			-1.57	-1.66	-1.30
Household Size			-1.96***	-1.76***	-1.64***
Stepparent(s)[d]			-1.98	-2.31	-1.30
Single parent			-1.47	-1.87^	-1.16
Nontraditional structure			-4.61	-4.67	-3.04
Socioeconomic status			9.01***	8.08***	6.79***
Below Poverty Level			-3.27**	-2.09*	-1.75
# Cognitive resources			0.07***	0.06***	0.05**
OLDS (fall k)				0.30***	0.27***
Optimism Z-score (fall k)					7.11***
R-square	.14	.14	.29	.32	.36

*** p<.001 **p<.01 *p<.05 ^p<.10

Note. Also includes a control for age at assessment. [a] Ref group is White, non-Hispanic. [b] Ref group is third-and-higher generation. [c] Ref group is Northeast. [d] Ref group is two parents.

Further, these variables explained large portions of the ethnic differentials observed in Models 1 and 2. Particularly important was that the first generation began to show a significant reading advantage over the third-and-higher generation.

Model 4 in Table 5.4 includes English OLDS scores, measured in the fall of kindergarten. Even five years later, this variable had a positive and highly significant direct effect on reading. Most important, once OLDS was controlled, the positive effect of being first or second generation on reading test scores at age 10 became evident. That is, OLDS acted as a suppressor for the effect of immigrant generation on school achievement. Only when the relatively weaker English skills of some immigrants were controlled, did the greater academic success of the first and second generations, compared to the third, come through clearly. Moreover, I found that the first generation effect was larger than that of the second.

The Model 4 results also show that controlling OLDS explains a portion of the effects of the socioeconomic variables and largely explains the remaining negative effects for Mexicans and other Hispanics. Taken together, the findings in Model 4 strongly justify my claim that when testing for ethnic, generational, and socioeconomic effects on school achievement, it is important to have an adequately measured control for early English language skill. When English ability is controlled, I find that both first and second generation students show higher performance than third and higher generation students.

Model 5 adds the Optimism Z-score to the prediction equation. This optimism measure had a positive and highly significant effect on reading scores. Most important, when this variable was added to the equation, the previously significant dummy variable for second generation status was reduced to non-significance, and that for first generation status was reduced in magnitude by about one-third. These results demonstrate that 'immigrant

optimism' explains part of the superior reading performance (net of controls, including English skills in kindergarten) of first and second generation students relative to third-or higher generation students.

Fifth Grade Mathematics Achievement

Table 5.5 shows identical calculations with mathematics test scores at 10 years of age as the dependent variable. Many results were similar to those for reading, although there were some differences. One was that, as reported by other researchers, boys out-perform girls in mathematics. Ethnic group differentials were similar to those for reading. (One exception was the particularly high mathematics scores for Chinese students.) Also, as with reading scores, when generation status was added to the equation in Model 2, there was negligible attenuation of the ethnic differences in math achievement.

Model 3 of Table 5.5 adds region, family structure, and socioeconomic status variables. The results suggested that a great deal of the ethnic differences can be explained by socioeconomic and demographic background factors – half of the effect for blacks/other minorities, Puerto Ricans, and almost two-thirds for Mexicans and other Hispanics. Although notable is the lack of influence of SES and family structure in the differential between Chinese and white students. Interestingly, the coefficients for Florida and Texas were positive and highly significant for math scores.

Model 4 of Table 5.5 shows the results for math with only OLDS as an additional control. As with reading, the higher mathematics performance of first and second generation students, compared to third-and higher generation students, was clearly observed only after the OLDS score was controlled. Further, this effect was largest for the first generation, who demonstrated

Table 5.5. Mathematics IRT Scores at Age 10 Regressed on Demographic Background Characteristics, Kindergarten English Language Ability, and Immigrant Optimism, n=5,097

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	100.74	100.62	101.02	96.70	107.20
Male=1	4.48***	4.48***	4.70***	4.71***	6.14***
Mexican[a]	-14.50***	-14.51***	-5.21***	-3.57**	-5.21***
Puerto Rican	-12.06***	-12.06***	-6.50**	-7.03**	-7.12**
Cuban	-4.90	-4.90	-6.85*	-6.49*	-8.03**
Indian (Asian)	4.63	4.64	3.48	2.89	0.87
Chinese	10.00***	9.98***	8.93***	8.67***	7.83***
Hispanic (not specified)	-12.28***	-12.27***	-4.59***	-3.87**	-5.68***
Asian/PI (not specified)	-5.00**	-5.00**	0.76	-.85	-0.16
Black/Other minority	-16.49	-16.49***	-8.74***	-9.43***	-10.18***
First Generation[b]		-0.51	2.18	4.64*	2.49
Second Generation		0.08	1.68^	2.55**	0.68
Texas[c]			5.46***	6.60***	7.50***
California			-0.13	0.75	0.71
Florida			6.84***	6.60***	6.59***
Midwest			-0.38	-0.51	-0.15
West			-0.63	-0.40	0.74
South			1.00	0.93	1.31
Household Size			-1.48***	-1.33***	-1.19***
Stepparent(s)[d]			-3.68*	-3.95*	-2.88^
Single parent			-3.26**	-3.59**	-2.84**
Nontraditional structure			-7.51**	-7.56**	-5.85*
Socioeconomic status			7.61***	6.85***	5.51***
Below Poverty Level			-0.19	0.77	1.19
# Cognitive resources			0.07***	0.06***	0.05***
OLDS (fall k)				0.24***	0.21***
Optimism Z-score (fall k)					7.43***
R-square	.13	.13	.25	.27	.32

*** p<.001 **p<.01 *p<.05 ^p<.10

Note. Also includes a control for age at assessment. [a] Ref group is White, non-Hispanic. [b] Ref group is third-and-higher generation. [c] Ref group is Northeast. [d] Ref group is two parents.

about one-sixth of a standard deviation advantage over third-and-higher generation students, once their relatively weaker kindergarten English skills were accounted for. The effect for second generation relative to third generation is smaller, but positive and statistically significant. Moreover, it is remarkable that the coefficient for OLDS (b=.24, β=.17) maintained such a strong effect even after five years, and that English ability imparts an advantage in mathematics skill as well as in reading.

Model 5 of Table 5.5 shows the results for math with the Optimism z-score added to the equation. Both first and second generation effects become much smaller and lose statistical significance. I also found that the optimism measure suppressed some of the negative relationship between being Mexican, Cuban, and unspecified Hispanic and math achievement. Although some of the positive effects of SES are explained, much remained, suggesting that higher-SES is not entirely responsible for more optimistic behaviors and attitudes, and that there appears to be something specific to one's ethnic identity and culture that imparts more optimism among immigrant students.

Even with the optimism z-score added to the model, the OLDS variable maintained a strong and significant effect on math, giving further strong confirmation of the importance of oral English language skill and effort and optimism in understanding the differential school performance of immigrant generations.

Determinants of Fifth Grade Science Achievement

Table 5.6 presents identical regressions for science scores at 10 years of age. The results are generally similar to those for reading and mathematics. Ethnic group deficits were large to begin with, to an extent similar to that for reading and math, particularly for Mexicans, Puerto

Table 5.6. Science IRT Scores at Age 10 Regressed on Demographic Background Characteristics, Kindergarten English Language Ability, and Immigrant Optimism, ECLS-K (n=5,097)

	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	40.26	40.93	43.02	39.45	44.80
Male=1	3.99***	3.97***	4.17***	4.18***	4.91***
Mexican[a]	-13.00***	-11.95***	-4.91***	-3.54***	-4.38***
Puerto Rican	-10.03***	-9.35***	-5.05**	-5.49**	-5.54**
Cuban	-4.09^	-3.07	-2.86^	-2.56	-3.35*
Indian (Asian)	0.66	2.07	1.40	0.92	-0.12
Chinese	3.95**	5.26***	4.45***	4.23***	3.81**
Hispanic (not specified)	-11.20***	-10.76***	-4.97***	-4.37***	-5.29***
Asian/PI (not specified)	-8.97***	-7.95***	-3.65***	-3.57***	-4.08***
Black/Other minority	-12.96***	-12.86***	-7.41***	-7.98***	-8.37***
First Generation[b]		-0.22	2.22^	4.25***	3.16**
Second Generation		-1.96**	-0.46	0.26	-0.69
Texas[c]			3.43***	4.37***	4.83***
California			-0.08	0.65	-.63
Florida			3.34**	3.15**	3.14**
Midwest			1.62	1.50	1.68^
West			0.11	0.29*	-.87
South			1.39	1.33	1.53^
Household Size			-1.34***	-1.21***	-1.14***
Stepparent(s)[d]			-0.83	-1.05	-0.51
Single parent			-2.01**	-2.29***	-1.91**
Nontraditional structure			-3.68**	-3.73*	-2.86^
Socioeconomic status			4.87***	4.25***	3.56***
Below Poverty Level			-1.91**	-1.12^	-0.94
# Cognitive resources			0.05***	0.04***	0.03***
OLDS (fall k)				0.20***	0.18***
Optimism Z-score (fall k)					3.79***
R-square	.21	.21	.35	.38	.41

*** p<.001 **p<.01 *p<.05 ^p<.10

Note. Also includes a control for age at assessment. [a] Ref group is White, non-Hispanic. [b] Ref group is third-and-higher generation. [c] Ref group is Northeast. [d] Ref group is two parents.

Ricans, and unspecified Hispanics and Asians. Contrasted to the results for reading and math, the ethnic differentials were actually somewhat larger since the standard deviation for fifth-grade science scores was smaller. This means that the Mexican coefficient, -.13.00 represents nearly an entire standard deviation difference from whites in science achievement.

Model 2 added generation status to the equation. Again, I found that generational differences did not explain much of the ethnic differentials in achievement. The addition of the region, family structure, and socioeconomic variables in Model 3 however did explain a large portion of the ethnic differences – over half of the Mexican and Hispanic differences, and nearly half for Puerto Ricans, Asians unspecified, and Blacks. Students in Texas and California also showed an advantage in science as compared to students in the Northeast.

Model 4 adds OLDS to the prediction equation. As with reading and math, a generational effect became evident for first generation, but not second generation students. Also, the coefficient for OLDS was .20 (β=.21), which suggested a strong, persistent relationship between early English oral language ability and later achievement in science, net other controls. Model 5 adds the immigrant optimism measure, and I found that this variable mediated some, but not all, of the positive effect for first generation. Ethnic group deficits, particularly for Mexicans and unspecified Hispanics are largely explained by socioeconomics and oral language skill. The first generation effect takes on its largest value only after oral English language skill is controlled. However, for science achievement, there is no significant difference between the second and third-and-higher generations. Controlling Optimism explains a significant share of the positive first generation effect.

Summary

This chapter has addressed several research questions. The first concerned the relationship between immigrant characteristics and kindergarten English oral language skill. My results suggest that time spent in the U.S., as indexed by generation status, as well as ethnicity, are the primary determinants of English ability at the beginning of formal schooling. Mexicans and unspecified Hispanics are the most linguistically disadvantaged and placed at risk for future educational difficulties as a result.

The second question concerned whether evidence of 'immigrant optimism' could be found among more recently arriving immigrants, relative to third or higher generation students. The results suggest that net family structure, socioeconomic status, and cognitive resources in the home, first and second generation students are rated as having better overall classroom dispositions, and parents expressed higher educational expectations for their children, than third generation students. To the extent that parental educational expectations and students' perceived levels of school effort are valid measures of 'immigrant optimism,' it appears that this hypothesis is supported.

Third, the regressions for reading, math, and science achievement addressed the question of how immigrant students, from various ethnic backgrounds, perform relative to native students. The results show that while ethnicity and socioeconomic status work in expected ways, failing to account for early English language ability at the start of school, as well as perceived levels of effort and optimism, will result in an incomplete picture of the educational processes among immigrants. I have demonstrated that early oral language skills in the language in which school is delivered are inextricably related to later achievement. Further, I have shown that given the relatively weaker English ability of certain groups, such as Mexicans, Puerto Ricans, Hispanics,

and Asians, achievement among such students is likely to be depressed. Moreover, relatively higher levels of optimism among these groups serve to raise achievement.

CHAPTER SIX
LINEAR GROWTH MODELS OF FIRST GRADE THROUGH FIFTH GRADE READING AND MATH ACHIEVEMENT

In this section, I present results from hierarchical analyses of immigrant students' reading and math achievement from the fall of kindergarten through the spring of fifth grade. In the previous chapter, I presented the relationships between immigrant characteristics, in particular, generation status, kindergarten English ability, optimism, and fifth grade achievement. Here, I extend this analysis using growth modeling to show how the same immigrant background characteristics are related to the achievement process throughout the elementary years. Additionally, in the final section I include school contextual characteristics in a three-level hierarchical growth model to explore whether school context explains variation in achievement over and above what is accounted for by individual-level characteristics.

My research questions are as follows: What is the relationship between ethnicity and achievement, both initial status and growth from first through fifth grade? How is generation status related to achievement growth in reading and math? Does kindergarten English language ability and/or 'immigrant optimism' moderate the relationships between ethnicity, generation status and achievement over time? Finally, how do school concentrations of ethnic groups, poverty, and limited English proficient students relate to initial achievement and rates of growth in reading and mathematics?

I expect that first and second generation students' achievement will initially be at levels comparable to that of the third and higher generation, but that it will grow at a slower rate due to their relatively weaker English skills. Accordingly, I expect that controlling for kindergarten English language ability will moderate first and second generation students' achievement growth

rates. Finally, I hypothesize that 'immigrant optimism' will explain some of the relationship between generation status and initial achievement and growth for both reading and math.

The Sample and Analytical Approach

This section of the analysis utilizes all available test score information from the spring of first grade through the spring of fifth grade. Students were tested at any or all of three time points, once each in the springs of first, third, and fifth grade. The baseline kindergarten sample included 9,758 individual student cases; however, there was some attrition of cases as well as an irregular testing design at each assessment, i.e., students were administered the assessments on varying dates. Therefore, an analytical approach suitable for an unbalanced data structure was necessary.

I used hierarchical linear modeling in HLM 6.0, since average intercepts and slopes may be calculated regardless of whether full data are available for each case. This approach resulted in a sample size of 5,316 cases for whom at least one test score (on either reading or math) was available from any of the three time points. (See Table 6.1 for unweighted means and standard deviations for the independent and dependent variables for these 5,316 cases.) Time was measured in one-month units, calculated using exact age-at-assessment age-months, where the starting point assessment age was centered at the mean. Missing assessment dates were obtained in the multiple imputation procedure as described in Chapter Three.

The Relationship between Time and Reading Achievement Growth

Table 6.2 presents the first set of HLM results, which includes reduced-form and full models of growth in reading IRT scores from first through fifth grade regressed on individual-level background characteristics. In each model, individual-level covariates are included on the

Table 6.1 Means and Standard Deviations for All Variables in Linear Growth Model Analysis

	Mean	SD
Level I		
Male	.50	.50
Ethnicity:		
Mexican	.20	.40
Puerto Rican	.02	.13
Cuban	.01	.10
Asian Indian	.02	.13
Chinese	.02	.15
White	.37	.48
Hispanic, unspecified	.12	.33
Asian, unspecified	.13	.34
Black/other minority	.12	.32
Generation:		
First Generation	.05	.21
Second Generation	.31	.46
Third/+ Generation	.64	.48
Family Composition:		
Household Size	4.74	1.53
Two Parents	.73	.44
Single Parent	.19	.39
Stepparent(s)	.05	.22
Nontraditional structure	.03	.17
Socioeconomic Status:		
Composite SES	-.06	.83
Poverty Status	.24	.42
Cognitive Resources	38.32	32.82
Optimism z-score	.06	.72
Oral Lang Dev Score (fall K)	37.99	15.77
Reading IRT (avg)	108.56	36.10
Mathematics IRT (avg)	87.62	30.48
Level II		
Region/State:		
Texas	0.07	.26
California	0.23	.42
Florida	0.06	.25
Northeast	0.18	.39
Midwest	0.19	.39
West (otherwise)	0.12	.33
South (otherwise)	0.14	.35
Percent Mexican	18.37	12.11
Percent Puerto Rican	1.52	4.13
Percent Cuban	.59	4.21

Table 6.1 Continued		
Percent Asian Indian	1.05	3.61
Percent Chinese	1.30	4.72
Percent Hispanic, unspec	13.82	14.09
Percent Asian, unspec	10.76	16.65
Percent Black/other minority	15.58	21.67
Percent Free/reduced lunch	35.70	28.10
Percent LEP	15.32	20.67
N	5,316	

intercept and interacted with the time slope, which represents the change in reading IRT scores associated with a one-month increase in time between the student's assessment date in the spring of first grade and assessment date in the spring of fifth grade.

Table 6.2.1 first shows a fully unconditional model. The intercept term of 106.82 was the overall average reading score of the sample. Model 1 includes only the time covariate, showing an average growth rate of 1.40 IRT points for every age-month. Model 2 includes only time and dummy variables for gender and ethnic group. The results in the top panel of Model 2 demonstrate that at the start of schooling, Mexicans and Puerto Ricans, followed by Blacks and Hispanics had significantly lower reading scores than whites. Further, the bottom panel of Model 2, showing the relationship between time and reading achievement for each ethnic group, demonstrates that many groups had slower growth in reading than whites, including Mexicans, Asian Indians, Chinese, and unspecified Asians. Significantly lower growth rates among Chinese and Asian students may indicate a "ceiling" effect, where absolute growth was lower because of an advanced starting point, given that prior research has suggested Asian groups often outperform other minority students. However, for Black and Mexican students, the negative coefficients represented both a lower starting point and slower growth, which has important

implications for reading trajectories through elementary school. The coefficient for time indicates that students' reading achievement, on average, grew at a rate of 1.39 IRT points per month, net ethnicity and gender.

Model 3 adds only generation status, and only the growth slope for first generation students was significant, but was positive and demonstrates that for each age-month, first generation students scored .08 points higher than third-and-higher generation students. Model 4 includes the vector of family composition and socioeconomic variables. I found that household structure was negatively related to students' first-grade reading performance but had no discernable relationship with reading growth. Further, composite SES was strongly related to students' starting points in reading, but had no net influence on reading growth. This finding suggests that family background had the greatest influence *before* formal schooling began for ultimate reading achievement. Much of the ethnic disadvantage in initial reading achievement was mediated by these covariates, as was the case for rates of growth among ethnic groups.

Model 5 adds only English Oral Language Development Scores from the fall of kindergarten. OLDS was strongly positive for first grade reading scores, but not significantly related to reading growth from first through third grades. Most importantly, with OLDS scores from kindergarten controlled, a positive generational effect became evident. This suggests that English ability acted as a suppressor on students' first grade reading performance, so that students with lower English oral language skills were placed at risk for educational difficulties in years to come, although these results also suggest that OLDS had no direct effect on reading growth through fifth grade, although it appeared to moderate the relationship between time and first generation students' growth so that the coefficient for first generation students' growth was higher once this variable was added.

Table 6.2.1 Three-Level Growth Model of Reading Scores, First through Fifth Grade, #n=5316

Independent Variables:	Unconditional	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept - π0	106.815	106.256	106.411	106.413	106.347	106.285	106.265
Male			-3.430***	-3.431***	-3.164***	-3.147***	-1.753**
Mexican			-9.401***	-9.236***	-4.215**	-3.381*	-4.211**
Puerto Rican			-8.868***	-8.790***	-5.971**	-6.295**	-6.227**
Cuban			-6.426**	-6.320*	-3.479	-3.215	-3.950
Asian Indian			-0.171	0.017	0.531	0.197	-0.779
Chinese			3.299	3.518	3.129	3.083	2.391
Hispanic, unspecified			-7.543***	-7.494***	-3.178*	-2.891^	-4.016**
Asian, unspecified			-2.719^	-2.556^	0.778	0.752	-0.454
Black/other minority			-7.680***	-7.675***	-3.960*	-4.545*	-4.848**
First Generation				-0.047	2.783	4.927**	2.524
Second Generation				-0.316	1.174	1.718*	-0.058
Family Composition:							
Household Size					-1.701***	-1.612***	-1.514***
Single Parent					-2.059*	-2.343*	-1.579
Stepparent(s)					-1.858	-2.135	-1.476
Nontraditional Structure					-4.245^	-4.326	-2.612
Socioeconomic Variables:							
Composite SES					6.722***	6.186***	5.025***
Poverty Status					-1.821^	-1.197	-0.671
# of Cognitive Resources					0.061***	0.051***	0.038**
OLDS						0.227***	0.185***
Optimism z-score							7.636***
Time Slope - π1 (Months)		1.397***	1.391***	1.391***	1.391***	1.391***	1.391***
Male			0.027*	0.027*	0.027*	0.027*	0.033**
Mexican			-0.048*	-0.058*	-0.052^	-0.047^	-0.051^
Puerto Rican			0.085	0.079	0.079	0.076	0.077
Cuban			0.033	0.022	0.025	0.027	0.023
Asian Indian			-0.171*	-0.188**	-0.191*	-0.193*	-0.200**
Chinese			-0.239***	-0.249***	-0.251***	-0.251***	-0.257***
Hispanic, unspecified			-0.036	-0.041	-0.038	-0.036	-0.042
Asian, unspecified			-0.131***	-0.142***	-0.137***	-0.136***	-0.142***
Black/other minority			-0.137***	-0.138***	-0.138***	-0.142***	-0.143***
First Generation				0.080*	0.085*	0.099**	0.088*
Second Generation				0.010	0.013	0.016	0.007

Table 6.2.1 Continued							
Family Composition:							
Household Size					-0.002	-0.002	-0.001
Single Parent					0.015	0.014	0.018
Stepparent(s)					0.008	0.006	0.010
Nontraditional Structure					0.003	0.002	0.009
Socioeconomic Variables:							
Composite SES					0.012	0.009	0.003
Poverty Status					-0.016	-0.013	-0.010
# of Cognitive Resources					-0.000	-0.000	-0.000
OLDS						0.002	.001^
Optimism z-score							0.036**
Variance Components:							
Level I - σ^2 (Within-person)	1202.79	179.68	180.46	180.34	180.47	180.39	180.37
Level II - $\tau_{\pi 0}$ (In initial status)	1.62	309.23	301.06	301.11	267.27	259.81	234.21
Level III - τ_{00} (Between-school)	107.76	122.24	119.95	119.91	124.83	125.85	129.99
Pseudo R-square	.00	.53	.54	.54	.56	.57	.59

***p<.001 **p<.01 *p<.05 ^p<.10

N represents cases with at least one observed test score.

Model 6 adds the measure of 'immigrant optimism.' Importantly, it mediated some of the relationship between generation status and initial reading achievement, and moderated part of the relationship between generation status and reading growth for first generation students. Further, this measure itself had a strong and positive relationship to both initial reading and growth in reading, net of other covariates, indicating that the combination of both higher parental educational expectations and more positively teacher-rated student work habits had a significant direct effect throughout the elementary years. Moreover, the addition of this covariate changed the intercept and growth coefficient terms for Mexicans and Hispanics, suggesting that if not for higher scores on the immigrant optimism measure, these students would have had even lower starting points and growth in reading performance.

The Relationship between Time and Mathematics Achievement Growth

Next, I ran identical regressions for mathematics achievement from kindergarten through fifth grade. Results are presented in Table 6.3.1. The results were similar to those for reading. However, whereas male students scored significantly lower than females in reading, at least initially, male students began school with higher mathematics achievement than female students and had higher rates of growth.

As with reading scores, Mexicans, Puerto Ricans, Hispanics and Blacks demonstrated significantly lower math scores in first grade relative to White non-Hispanics. Blacks also had significantly lower growth rates in math, while Mexican growth rates were only marginally significant and negative, suggesting that unlike reading scores, Mexicans had nearly identical growth rates to whites in math. Whereas as previously for reading scores, Asian Indians and Chinese showed lower rates of growth, for math scores, these groups had growth rates comparable to Whites.

Table 6.3.1 Three-Level Growth Model of Mathematics Scores, First through Fifth Grades, #n=5316

Independent Variables:	Unconditional	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept - π0	86.460	86.062	86.225	86.222	86.176	86.128	86.100
Male			3.185***	3.186***	3.388***	3.401***	4.734***
Mexican			-8.477***	-8.710***	-4.948***	-4.284**	-5.079***
Puerto Rican			-9.297***	-9.408***	-7.109**	-7.367**	-7.288**
Cuban			-5.970^	-6.120^	-4.108	-3.896	-4.594
Asian Indian			-0.315	-0.579	-0.071	-0.332	-1.244
Chinese			3.794	3.482	3.256	3.217	2.577
Hispanic, unspecified			-7.426***	-7.495***	-4.122**	-3.891**	-4.959***
Asian, unspecified			-1.806	-2.035	0.303	0.291	-0.845
Black/other minority			-9.672***	-9.679***	-6.545***	-7.003***	-7.284***
First Generation				0.043	1.828	3.526*	1.246
Second Generation				0.450	1.377^	1.809*	0.115
Family Composition:							
Household Size					-1.084***	-1.012***	-0.919***
Single Parent					-2.713**	-2.940**	-2.207**
Stepparent(s)					-2.316	-2.538	-1.913
Nontraditional Structure					-5.847**	-5.900**	-4.257*
Socioeconomic Variables:							
Composite SES					5.133***	4.705***	3.594***
Poverty Status					-0.155	0.339	0.838
# of Cognitive Resources					0.051***	0.042**	0.030**
OLDS						0.180***	0.139***
Optimism z-score							7.298***
Time Slope - π1 (Months)		1.174***	1.178***	1.178***	1.178***	1.177***	1.178***
Male			0.061***	0.061***	0.062***	0.062***	0.072***
Mexican			-0.035^	-0.064**	-0.042^	-0.038	-0.045*
Puerto Rican			0.011	-0.002	0.011	0.009	0.009
Cuban			-0.050	-0.075	-0.067	-0.066	-0.072
Asian Indian			0.067	0.029	0.027	0.025	0.015
Chinese			0.038	-0.002	-0.009	-0.009	-0.019
Hispanic, unspecified			-0.011	-0.023	-0.003	-0.002	-0.011
Asian, unspecified			0.045^	0.015	0.026	0.027	0.017
Black/other minority			-0.081***	-0.082***	-0.062*	-0.065**	-0.068**

Table 6.3.1 Continued							
First Generation				0.050	0.052	0.064^	0.045
Second Generation				0.052**	0.053**	0.055**	0.041*
Family Composition:							
Household Size					-0.009*	-0.009^	-0.008^
Single Parent					-0.030^	-0.031^	-0.025
Stepparent(s)					-0.041^	-0.042^	-0.036
Nontraditional Structure					-0.071*	-0.071*	-0.061^
Socioeconomic Variables:							
Composite SES					0.041***	0.039***	0.030**
Poverty Status					0.019	0.022	0.025
# of Cognitive Resources					0.000	0.000	-0.000
OLDS						0.001*	0.001
Optimism z-score							0.060***
Variance Components:							
Level I - σ^2 (Within-person)	850.12	102.96	103.37	103.19	102.73	102.65	101.99
Level II - $\tau_{\pi 0}$ (In initial status)	1.92	247.03	237.81	237.85	219.15	214.53	191.65
Level III - τ_{00} (Between-school)	70.96	77.55	76.34	76.39	79.31	79.82	83.68
Pseudo R-square	.00	.54	.55	.55	.57	.57	.59

***p<.001 **p<.01 *p<.05 ^p<.10

N represents cases with at least one observed test score.

Once generation status was controlled in Model 3, Mexicans showed significantly lower rates of growth in math, and second generation students show significantly higher rates of growth relative to third-and-higher generation students. These relationships became stronger once the vector of family composition and socioeconomic variables were entered in Model 4. Further, the intercept estimate for second generation students became marginally significant and positive. Further, much of the ethnic disadvantage was reduced at both the end of first grade and for the growth rates, excluding the growth rate for Blacks, which remained significant and negative. As prior research has suggested, family structures that are not two-parent impart a significant disadvantage for achievement, particularly for the first-grade intercept term. SES and number of cognitively beneficial resources in the home were also strongly positive.

Model 5 adds only OLDS scores on the intercept and time slope. As with reading scores, OLDS significantly mediated the generation status intercept terms and moderated some of the generation status growth rates, so that controlling for kindergarten English oral language ability helped explain the true relationship between generation status and math ability. First generation and second generation students showed significantly higher math scores at the end of first grade *and* growth rates relative to third generation students only when their relatively weaker English skills were controlled. Also, English ability itself was strongly related to first grade math scores as well as growth rates. This was an expected finding for reading scores considering the relationship between English skills and the ability to read in English, but these results suggest that English ability is also fundamental to performance in mathematics.

In Model 6, the 'immigrant optimism' measure is included. Once again, I found that this variable mediated much of the generation effect for performance in the spring of first grade and explained much of the growth slope for generation status. Only second generation growth

remained significant with this variable in the model. These findings provided further support for the immigrant optimism hypothesis. Immigrant students' perceived work effort in combination with parental educational expectations are essential components in the relationship between immigrant status and educational achievement.

School Contextual Characteristics and Performance in Reading and Mathematics

Table 6.2.2 presents the relationships between reading performance from first through fifth grade and all previously examined factors, as well as kindergarten school contextual characteristics – a vector of ethnic, poverty, and LEP concentrations and residence dummies. (Model 6 of Table 6.2.1 is presented alongside Model 7 in Table 6.2.2 for purposes of comparison.) I sought to discover whether contextual characteristics further mediated the relationship between individual-level covariates and the outcomes of interest. However, I calculated the contextual-level models with the level-II covariates on the intercept term only (rather than the time slope), since in terms of time ordering, the kindergarten contextual variables are theoretically more relevant to students' starting point on assessments.

Concerning Model 7, I found that some ethnic concentrations had significant negative relationships with initial reading performance, although little of the individual-level effects were mediated. First, as percentage of Mexicans increased, initial reading status decreased. The same was found for percentage Puerto Rican, Hispanic, Asian, and Black/other minority. Greatest in size was the effect for percent Blacks/other minorities (b=-.178, β=-.11), followed by unspecified Hispanics (β=-.07). In contrast, the proportion of Asian Indian and Chinese students was positively related to reading performance. Further, I also controlled for percent receiving free/reduced-price lunch, an estimate of poverty concentration. Thus, the negative relationships

Table 6.2.2 Three-Level Growth Model of Reading Scores, With Contextual Variables, First through Fifth Grades, #n=5316

Independent Variables:	Model 6	Model 7
Intercept - π0	106.265	108.375
Male	-1.753**	-1.710**
Mexican	-4.211**	-4.156**
Puerto Rican	-6.227**	-6.120**
Cuban	-3.950	-4.122
Asian Indian	-0.779	-0.103
Chinese	2.391	3.016
Hispanic, unspecified	-4.016**	-4.036**
Asian, unspecified	-0.454	-0.672
Black/other minority	-4.848**	-4.659**
First Generation	2.524	2.697
Second Generation	-0.058	0.063
Family Composition:		
Household Size	-1.514***	-1.501***
Single Parent	-1.579	-1.600
Stepparent(s)	-1.476	-1.603
Nontraditional Structure	-2.612	-2.545
Socioeconomic Variables:		
Composite SES	5.025***	5.042***
Poverty Status	-0.671	-0.654
# of Cognitive Resources	0.038**	0.037**
OLDS	0.185***	0.186***
Optimism z-score	7.636***	7.654***
Time Slope - π1 (Months)	1.391***	1.391***
Male	0.033**	0.033**
Mexican	-0.051^	-0.051^
Puerto Rican	0.077	0.077
Cuban	0.023	0.023
Asian Indian	-0.200**	-0.200**
Chinese	-0.257***	-0.257
Hispanic, unspecified	-0.042	-0.042
Asian, unspecified	-0.142***	-0.142***
Black/other minority	-0.143***	-0.143***
First Generation	0.088*	0.088*
Second Generation	0.007	0.007
Family Composition:		
Household Size	-0.001	-0.001

Table 6.2.2 Continued		
Single Parent	0.018	0.018
Stepparent(s)	0.010	0.010
Nontraditional Structure	0.009	0.009
Socioeconomic Variables:		
Composite SES	0.003	0.003
Poverty Status	-0.010	-0.010
# of Cognitive Resources	-0.000	-0.000
OLDS	.001^	0.001^
Optimism z-score	0.036**	0.036**
Level II		
% Mexican		-0.154**
% Puerto Rican		-0.395**
% Cuban		0.120
% Asian Indian		0.530**
% Chinese		0.348*
% Hispanic		-0.174***
% Asian		-0.085*
% Black/other		-0.178***
% Free/reduced-price lunch		-0.106**
% LEP		-0.020
Texas		2.919
California		-0.737
Florida		2.575
Midwest		-2.355
West		-1.092
South		-4.087*
Variance Components:		
Level I - σ^2 (Within-person)	180.37	180.56
Level II - $\tau_{\pi 0}$ (In initial status)	234.21	236.88
Level III - τ_{00} (Between-school)	129.99	48.91
Pseudo R-square	.59	.65

***p<.001 **p<.01 *p<.05 ^p<.10
N represents cases with at least one observed test score.

for the ethnic minority groups should not be construed as being a result of the higher or lower poverty rates for these groups. As was expected, the proportion of poverty at a school decreased reading performance significantly (β=-.08). However, the percentage of LEP students was not related to reading performance.

The only notable finding from the geographic residence covariates was that for students in the South, where it showed a strong negative relationship with reading performance. Apparently some unobserved factors associated with attending school in the South, perhaps rurality and its associated characteristics (see e.g., Durham and Smith 2006), depress reading achievement. It is also notable that very little of the relationship between the child-level covariates and reading performance changed with the addition of the contextual variables.

Next, I performed identical regressions including the school contextual characteristics for mathematics performance, which are presented in Table 6.3.2. As with reading performance, percent Mexican, Puerto Rican, Hispanic, Asian, and Black/other minority were significant and negatively related to mathematics ability, while higher proportions of Asian Indians and Chinese students were associated with higher math performance. Only the Cuban concentration covariate was not significant among these ethnic concentrations, and Blacks/other minority concentrations had the largest effect size (β=-.13), as was the case for reading. Percentage of students eligible for free/reduced-price lunch was second in strength of its relationship with math achievement (β=-.06).

While for reading, only the coefficient for South was significant, those for Texas and Florida had strong and positive associations, as compared to the Northeast. This replicates the finding from the cross-sectional analyses in the previous chapter which showed Texas and Florida students' performance higher than those in the Northeast. Without further examination of the policies in these states, any conclusions about this finding would be speculative; however, it demonstrates the importance of accounting for state-level differences in achievement. Further research would be well served by exploring state accountability policies that improve mathematics achievement.

Table 6.3.2 Three-Level Growth Model of Mathematics Scores, With Contextual Variables, First through Fifth Grades, #n=5316

Independent Variables:	Model 1	Model 2
Intercept - π0	86.100	86.660
Male	4.734***	4.788***
Mexican	-5.079***	-5.030***
Puerto Rican	-7.288**	-7.229**
Cuban	-4.594	-4.644
Asian Indian	-1.244	-0.689
Chinese	2.577	3.289
Hispanic, unspecified	-4.959***	-4.946***
Asian, unspecified	-0.845	-1.188
Black/other minority	-7.284***	-7.129***
First Generation	1.246	1.356
Second Generation	0.115	0.212
Family Composition:		
Household Size	-0.919***	-0.913***
Single Parent	-2.207**	-2.220**
Stepparent(s)	-1.913	-2.031
Nontraditional Structure	-4.257*	-4.194*
Socioeconomic Variables:		
Composite SES	3.594***	3.622***
Poverty Status	0.838	0.869
# of Cognitive Resources	0.030**	0.029**
OLDS	0.139***	0.141***
Optimism z-score	7.298***	7.308***
Time Slope - π1 (Months)	1.178***	1.178***
Male	0.072***	0.072***
Mexican	-0.045*	-0.045*
Puerto Rican	0.009	0.009
Cuban	-0.072	-0.072
Asian Indian	0.015	0.015
Chinese	-0.019	-0.019
Hispanic, unspecified	-0.011	-0.011
Asian, unspecified	0.017	0.017
Black/other minority	-0.068**	-0.068**
First Generation	0.045	0.045
Second Generation	0.041*	0.041*
Family Composition:		
Household Size	-0.008^	-0.008^
Single Parent	-0.025	-0.025
Stepparent(s)	-0.036	-0.036

Table 6.3.2 Continued		
Nontraditional Structure	-0.061^	-0.061^
Socioeconomic Variables:		
Composite SES	0.030**	0.030**
Poverty Status	0.025	0.025
# of Cognitive Resources	-0.000	-0.000
OLDS	0.001	0.001
Optimism z-score	0.060***	0.060***
Level II		
% Mexican		-0.092*
% Puerto Rican		-0.318*
% Cuban		0.005
% Asian Indian		0.395**
% Chinese		0.402**
% Hispanic		-0.151***
% Asian		-0.060*
% Black/other		-0.182***
% Free/reduced-price lunch		-0.068**
% LEP		-0.005
Texas		5.717**
California		-0.869
Florida		6.391**
Midwest		-1.511
West		-1.279
South		-0.201
Variance Components:		
Level I - σ^2 (Within-person)	101.99	102.07
Level II - $\tau_{\pi 0}$ (In initial status)	191.65	193.32
Level III - $\tau_{\pi 1}$ (Between-school)	83.68	31.62
Pseudo R-square	.59	.65

***p<.001 **p<.01 *p<.05 ^p<.10
N represents cases with at least one observed test score.

Summary

This chapter has examined the relationships between immigrant background characteristics and the process of achievement in reading and math from first through fifth grades. The results from each subject-area section largely support one another: Mexicans, Puerto Ricans, Hispanics, Asians (excluding Asian Indians and Chinese), and Blacks begin their

formal schooling trajectories with significantly lower levels of achievement than non-Hispanic Whites. Further, rates of growth among these groups are lower than for Whites. Importantly, the growth models replicate the findings from the prior chapter that explored these relationships for cross-sectional fifth grade outcomes.

Once again, I have shown that the true relationship between immigrant generation status and achievement is evident only once initial English oral language ability is controlled. Moreover, this relationship is strongly mediated by levels of 'immigrant optimism,' as indexed by measured by student effort and parental educational expectations for children. This provides strong evidence for the immigrant optimism hypothesis, suggesting that first and second generation students perform higher than third generation students, net English skills, and would perform lower if not for higher levels of effort and aspiration for mobility.

Finally, I show that while contextual differences between schools do not alter substantially the individual-level variation in achievement, they are significantly related to performance in both reading and math. Concerning geographic residence, I found that attending school in certain states has negative positive consequences for math achievement, namely for those students in Texas and Florida. Second, attending school in the South is negatively related to reading achievement.

One of my most compelling findings is that for some ethnic groups, higher concentrations in kindergarten have deleterious consequences for achievement. Higher proportions of Mexicans, Hispanics unspecified, Asians, and Blacks/other minorities especially, have significant direct negative effects on achievement. Though these students are very young, ethnic and language minority students may have begun to experience what Valenzuela (1999) termed "subtractive schooling" and "subtractive assimilation." Students experience conflicting identities

when, as suggested in other research (Crosnoe 2005; Ogbu 1999; Suarez-Orozco and Suarez-Orozco 2001) school personnel perceive foreign language use as an obstacle, or when personnel who are not ethnic minorities themselves are threatened by or lack familiarity with the behaviors, values, and expectations of another culture. Yet minority students gain resources through social networks with their ethnic group peers. Thus, students who perceive that teachers and other school personnel disparage characteristics of their ethnic identity may lose social resources through the process of assimilation, or conversely, in order to maintain the strength of ethnic ties and identity they may disengage from school.

Further, the proportion of students receiving free or reduced-price lunch has a strong negative effect. Roscigno (1998) suggested that the grouping together of lower-SES students (and many of the ethnic minority groups examined here are historically socioeconomically disadvantaged) depresses overall achievement because it generates a peer-group effect where "aversion" to achievement becomes normative. Moreover, economically disadvantaged, segregated schools may have less to offer in the way of physical resources, physical environment, teacher quality, and course offerings.

CHAPTER SEVEN
DISCUSSION AND CONCLUSIONS

Summary

I have conducted an analysis of the relationship between immigrant characteristics and elementary school achievement. In particular, I examined the performance of ethnic groups representing the majority of immigrant children currently attending school in the U.S., including Mexicans, Puerto Ricans, Cubans, Asian Indians, Chinese, and groups panethnically defined as Hispanic or Asian. In addition, I have examined how the performance of each group is mediated by time in the U.S. (measured using generation status), family composition, socioeconomic status, and early English language ability. I have tested whether there is evidence of 'immigrant optimism,' as was proposed initially by Kao and Tienda (1995).

I performed these analyses using a nationally representative data base, the ECLS-K, from which I created a special subsample of language minority students and their school peers, since language identity is an indicator of immigrant status. The ECLS-K provided the opportunity to examine the relationship between immigration and educational performance among elementary-aged school children, whereas the vast majority of prior research has examined the educational performance of middle- and high-school-aged youth. Further, the ECLS-K provided a concrete scale of early English oral language ability at the start of formal schooling; thus, this study contributes to the literature by examining the educational performance of an under-studied group – immigrant children – and allows for the testing of research question not heretofore possible, i.e., how is actual English ability related to achievement outcomes?

The results point to several conclusions. First, there are certain groups of students within the American educational system who are especially at risk for educational failure, namely Mexicans and unspecified Hispanics. This is apparently due to the lower socioeconomic position

of their families, the high ethnic concentrations of their schools, and relatively weak English abilities. Second, the parents of immigrant children apparently hold higher educational expectations than those of third-and-higher generation children, and moreover, these same children are rated more positively by teachers on measures of student persistence and work effort. This provides preliminary supporting evidence for the 'immigrant optimism' hypothesis, i.e., immigrant parents and students have more optimistic orientations toward schooling as an avenue for upward mobility.

Third, I initially found that first and second generation students had achievement in reading, math, and science similar to that of third generation students; however, once initial English ability is controlled, first and second generation students have higher academic achievement. The English oral language abilities that children bring with them to the classroom when formal schooling begins are directly related to achievement at least through the fifth grade, and apparently act as a suppressor on the superior performance of immigrant students relative to native-born students. This relationship was found among both cross-sectional and linear growth achievement outcomes.

Providing secondary supporting evidence for the immigrant optimism hypothesis, I found that the optimism z-score partially explains generational effects on academic achievement. Altogether, my findings suggest that among the most important factors to consider when studying the educational achievement of immigrants are generational status, English language ability, achievement orientations, and ethnicity. Both ethnicity and generation status determine language ability as well as motivation towards schoolwork.

Finally, returning to the theoretical frameworks used to cast the various courses of immigrant adaptation and outcomes, I argue that my findings most closely support the segmented

assimilation hypothesis. The myriad influences that determine adaptation are evidently at work shaping educational achievement early in childhood, in elementary school. Time is an important factor, perhaps more saliently among parents, who can still remember the circumstances of their former lives in another country. Their children have undoubtedly been inculcated with the importance of high aspirations and hard work. However, length of residence in the U.S. is but one influence. Factors such as family income and parental human capital, English ability, ethnicity, geographic residence and poverty appear to be more proximal to processes of educational attainment than time in the U.S. The influence of time is not significant, as shown in the analyses here, until related factors such as these, are controlled.

However, a classical assimilation framework is applicable to my findings to the extent that weighted unadjusted means in Chapter Four show a linear, though bumpy, indirect relationship between generation status and educational achievement. First and second generation students have lower scores on average, than third-and-higher generation students. But substantial variation within generational groups, namely in socioeconomic status, English skills, race and its correlates, *directly* affect immigrant adjustment in the U.S., so these factors mediate immigrants' length of residence.

Limitations

Some limitations of the current study must be noted. First, while it would have been desirable to study outcomes for each nativity group separately, there were too few cases in some groups for this to be possible. Using mother's nativity, I originally explored differences among under-represented groups such as Hmong, Koreans, Vietnamese, Cambodian, Columbian, Dominican, etc., however, I only retained those groups which were sensitive to statistically significant differences *on the outcomes of interest in this study.* Therefore, it may be that for

other outcomes, such as student aspirations, self-esteem, or ultimate educational attainment, my list of ethnic categories is not exhaustive.

Related to this is that interactions between ethnic and generation groups were not possible to calculate because of small cell sizes. (For instance, there were fewer than 10 third generation Asian Indians and similarly small numbers of first generation Blacks in the subsample.) Interactions would have been possible if I had collapsed some of the specific nativity groups into a larger pan-ethnic categorization, but since prior research suggests more specificity in identifying groups is ideal, I chose instead to be specific when possible, and tested for mediation of ethnic effects by generation status rather than testing for interaction effects.

An important limitation of this study is that I did not attempt to establish causality between the background variables of interest and achievement outcomes. As with many studies employing a secondary data source, this study is not experimental; however, as a descriptive study, the findings highlight general patterns between immigrant characteristics and achievement, which provides insight about broad demographic relationships. These findings present preliminary conclusions concerning which immigrant groups are particularly at-risk and the essential relationship between English ability and educational achievement. Further, given that I analyze over-time data, causal relationships may be preliminarily inferred, though not firmly estimated.

Moreover, further data regarding the actual school experiences of students would have been desirable. These analyses employ proximate indicators for certain processes, such as percentage of impoverished students which serves as a proxy for student engagement, school resources, and/or teacher salary and training, but without more qualitative information about

children's actual experiences in school, the full picture of the processes involved in student learning remains unclear.

Related to this is my use of generation status for time spent in the U.S. Actual person years were not available in the data; thus generation status is the nearest proxy for exposure in the U.S. in the ECLS-K. Other research has found that the number of years parents and children have lived in the U.S. is significantly related to achievement outcomes, so the relationships between generation status and achievement may be over- or underestimated in the current study.

Policy Implications

While findings from secondary data analyses of large nationally representative datasets are often one step removed from program recommendations, such findings still provide a starting point from which to make the leap to policy. My results demonstrate that certain immigrant groups are especially at-risk for school failure and socioeconomic disadvantage later in life and suggest a number of measures that school personnel could take to improve the chances for these students.

These results suggest the need for a special emphasis on English language remediation for immigrant students. Mexicans and other Hispanic students, perhaps as a result of living in more ethnically isolated social enclaves and attending ethnically isolated schools, are especially linguistically disadvantaged, and this fact has important implications for their academic trajectories. I have shown that English language ability at the start of formal schooling maintains direct effects *at least* through the fifth grade, with indirect effects likely to linger for years to come. Therefore, early English classes with higher academic rigor are necessary, and further, more remediation than is currently offered is warranted. Many states with large numbers of immigrant students, e.g., California, have recently curtailed funding for extended English

assistance classes. In fact, students in California public schools are now limited to receiving 30 days of foreign language instruction (usually Spanish) and are further limited to receiving only three years of any sort of "structured immersion" with second-language instruction teachers. My findings, however, demonstrate that establishing strong academic English skills early among immigrant students is essential. Prior research has also suggested that later achievement is strongly dependent on early achievement; thus the difficulties experienced by students with weak English skills are likely to become magnified over time. States and school districts should be made aware of the liabilities they create for the future when students are not properly remediated when they enter school.

Greater resources should be provided so that more ESL teachers can be available for LM students, and importantly, proper assessment of ESL students should be encouraged. Research, such as that conducted by Rumberger and Gandara (2000), suggests the importance of testing LM students with appropriate assessments and continually over their schooling careers. Testing should be done at the student-, rather than school or classroom level so that school personnel can determine whether students are improving their English skills. Appropriate assessments must be used, namely special English language tests rather than subject-matter tests, so that English (dis)ability is not confounded with subject-matter knowledge.

My findings regarding generation status and achievement demonstrate the importance of parent-school partnerships. That first and second generation students would perform higher than third/higher generation students if not for their relatively weaker English skills suggests that parents' wishes for their children's achievement matter greatly. Beyond creating supportive and cognitively beneficial environments for children, parents seem to have a direct effect on levels of children's effort and orientation towards schooling. Therefore, school personnel should actively

encourage parental participation with children's schoolwork. This may be especially difficult for immigrant parents as a result of hectic work schedules or lack of English facility. Recommendations might include having regular meeting sessions with such parents at night or during the weekend. Perhaps incentives could be provided, such as meals or English-as-a-Second-Language instruction for adults that could entice greater participation.

Schools with large numbers of Spanish-language background students should also be encouraged to provide Spanish-speaking liaisons for parents who could educate them about the expectations schools have for their participation in their children's schoolwork, which may be very different from those they held in another country. Often, immigrant parents have had very little education themselves, which may make schools an intimidating environment, but the assistance of a school liaison could help make the experience of participating in their children's schooling less daunting or unfamiliar.

Future Research

The findings from the current study also suggest several avenues for future research. As the ECLS-K is extended to the eighth grade, it will be interesting to find whether the current relationships hold. Middle school expectations are substantively different from those of elementary school; however, the academic positions of these students in fifth grade are likely to predict later achievement. Thus, following a cohort of immigrant students from kindergarten through high school will provide valuable information about ultimate educational attainment, especially as they move to postsecondary schooling.

Unfortunately, little information was available about the actual content of the language programs the students of the ECLS-K received. However, it might be useful to see whether the LM status is indeed a "track" by comparing the academic trajectories of LM and non-LM

students separately. Questions raised might include: Are these students properly situated to take advanced coursework in middle and high school? Does the LM label, in effect, constitute a "treatment"? Propensity score matching could be used to establish a control group of students similar to LM students at the beginning of school but who do not become identified as such. This method would enable researchers to determine whether this label establishes a different trajectory from students not similarly labeled.

Immigrant students face a host of challenges related to their immigrant status, and English language ability is just one of these. Policy must be directed by scientific research, rather than political ideology shaped by racial stereotypes and fear-driven beliefs about language use. While differences among students shape variation in achievement, these differences should be seen as strengths, because diversity offers opportunity for learning among all.

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APPENDIX: ECLS-K Variables Used in Multiple Imputation Procedure

Variables Used for Multiple Imputation of Independent Variables in SAS IVEware

Variable Name	Variable Description
Northeast (omitted)	Census region Northeast = 1
Midwest	Census region Midwest = 1
West	Census region West = 1
South	Census region South = 1
Texas	Resident of Texas (kindergarten) = 1
California	Resident of California (kindergarten) = 1
Florida	Resident of Florida (kindergarten) = 1
White (omitted)	Composite race, White, non-Hispanic = 1
Mexican	Self-identified, Mexican = 1
Puerto Rican	Self-identified, Puerto Rican=1
Cuban	Self-identified, Cuban=1
Asian Indian	Self-identified, Asian Indian = 1
Chinese	Self-identified, Chinese = 1
Hispanic, unspec	Composite race, Hispanic unspecified = 1
Asian, unspec	Composite race, Asian/Pacific Islander = 1
Black/other minority	Composite race, Black/More than 1 race = 1
First Gen	Born in another country, First Generation = 1
Second Gen	Parents born in another country, Second Generation = 1
Third Gen (omitted)	Both child and parent born in U.S., Third or higher Gener = 1
Poverty	Family below poverty line (kindergarten) = 1
Public School	Attended a public school (kindergarten) = 1
Fullday	Attended full-day kindergarten = 1
LM	Child is Language Minority = 1
Two parent	Two-parent family(adoptive or bio) = 1
Single	Single-parent family = 1
Stepparent(s)	Stepparent(s) family = 1
Nontraditional	Nontraditional family structure = 1
Parent care (omitted)	Preschool care was by parent = 1
Relative	Preschool care by a relative = 1
Nonrelative	Preschool care by a non-relative = 1
Head Start	Preschool care in Head Start = 1
Center-based	Preschool care in a center-based facility = 1
More than one care	Preschool care involved more than one arrangement = 1
Household size	Number of household members
Age born	Age of mother when first child was born
Cog Resources	Averaged sum of books and audio items possessed by child
% Minority	Percent of kindergarten school minority
% Free/reduced lunch	Percent of kindergarten school free-reduced price lunch eligible
% Hispanic	Percent of kindergarten school Hispanic
% LEP	Percent of kindergarten school limited-English Proficient

Table A. Continued	
OLDS	Oral Language Development Score, fall kindergarten
Optimism z-score	Z-score (Parents' educational expectations, teacher rating of approaches to learning, fall kindergarten)
Reading IRT fall-k	Reading IRT score, fall of kindergarten
Math IRT fall-k	Math IRT score, fall of kindergarten
Approaches	Teacher rating of 'Approaches to Learning,' fall kindergarten
Internalizing	Teacher rating of Internalizing Behavior problems, fall kindergarten
Externalizing	Teacher rating of Externalizing Behavior problems, fall kindergarten
Interpersonal	Teacher rating of Internalizing Behavior problems, fall kindergarten
Self-control	Teacher rating of Self-Control Behavior, fall kindergarten

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