The Pennsylvania State University
The Graduate School
College of the Liberal Arts

DIVERGENT ACADEMIC PATHWAYS: RACIAL/ETHNIC, NATIONAL ORIGIN, AND GENERATIONAL STATUS VARIATION IN SCHOOL READINESS, KINDERGARTEN THROUGH EIGHTH GRADE ACADEMIC ABILITY GROWTH, AND ADOLESCENT ACADEMIC SELF CONCEPT

A Dissertation in
Sociology and Demography
by
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Submitted in Partial Fulfillment
of the Requirements
for the Degree of

Doctor of Philosophy

December 2009

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ABSTRACT

The present study draws upon nationally representative data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 to examine variation in children's early academic performance along racial/ethnic, generational status, and national origin lines. This study comprises three distinct analytic chapters. The first uses a multilevel logistic regression approach to examine patterns of between-child variation in cognitive and socioemotional school readiness. The second analytic chapter examines children's reading and mathematics ability growth from kindergarten through eighth grade using a three-level mixed-effects modeling framework. The final component of the present study examines variation in adolescents' reading and mathematics self-concept prior to high school entry using a two-level random-effects modeling approach. Results suggest that immigrant generational status is an important moderator of racial/ethnic variation along several measures of academic success. Among non-Asian minority children, those with foreign-born mothers tend to demonstrate lower levels of school readiness and flatter ability growth trajectories than third-plus generation children. Among Asian children, however, children of foreign-born mothers experience advantages relative to their first and second generation counterparts. After adjusting for an array of family background characteristics, children from racial/ethnic minority and immigrant families demonstrate comparable ability growth trajectories to non-Hispanic white children of native-born mothers, with the exception of non-Hispanic black and first/second generation Mexican children, who fall increasingly behind over the elementary and middle school years. Children of immigrant mothers generally demonstrate higher levels of academic self-concept than children of native-born mothers, and most minority adolescents have comparable levels of academic self-concept to non-Hispanic white adolescents after adjusting for family background characteristics.

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ACKNOWLEDGEMENTS

In this section of the study, I test the hypothesis that an *Acknowledgements* section can extend to two full pages while remaining gracious and sincere, without lapsing into gratuitous self-indulgence. Prior research suggests this is an unlikely outcome.

Many, many individuals have helped me in innumerable ways throughout my time at Penn State. I'll begin by thanking my biggest influence, my mentor, George Farkas, for doing nothing less than teaching me how to be a sociologist. I will be proud if 50 years from now people identify me as "a student of Farkas." It's a compliment I strive to live up to.

When George left Penn State in my final year of study, Michelle Frisco stepped in as my advisor and provided me with invaluable advice, assistance, and motivation, devoting far more time and energy to me than I could have ever expected or could ever begin to repay. I am honored to be the first in what I know will be a long line of very fortunate students who write their dissertations under her guidance. David Almeida, Alan Booth, Susan Faircloth, and Paul Morgan shared their time and expertise while working with me on different research projects, and from them I gained tremendous perspective on what it takes to be a successful scholar. I would also like to thank Emily Greenman for her willingness to join my committee late in the game, and Duane Alwin for his mentor- and friendship. And when it comes to people I would not be here without, Sondra Morrison deserves special thanks. I would have missed approximately 100% of the various graduate school deadlines without her gracious assistance.

I would certainly not be putting the finishing touches on a dissertation in Sociology and Demography if several wonderful people in the Department of Sociology at Johns Hopkins University had not exposed me to the discipline. I am especially thankful for their prescient advice, which led me to pursue further study at Penn State. In particular, I thank Karl Alexander for advising me in my first research endeavor and for continuing to encourage me to do good work. I absolutely could not have had a better initial role model.

I was fortunate to spend my graduate years with an extraordinary group of grad student friends. These people provided companionship, empathy, levity (sprinkled with appropriate doses of gravity), and generally a hell of a good time. I would especially like to recognize, in descending order of approximate height, Marlay, Ed, P. Houle, Lindner, Parks, Hawkins, Schroeder, and Stout.

I also appreciate the help of my friends from outside Oswald Tower, without whom I could not have survived graduate school. My musician friends helped me blow off steam and exercise parts of my brain that otherwise would have gone neglected. Special thanks go to Adam, Eric, Derrick, and, most of all, Dr. Andrew Jackson Sr., whose warmth, generosity, and consummate professionalism made 6 years of gigs a joy. Everyone from the SCPT and CRPR deserves recognition for providing many rewarding extracurricular experiences as well.

I have the most supportive family in universe. My parents, Jim and Judy, and my sister, Sarah, provided me with the immeasurable advantages that come from growing up in a nurturing, stimulating home. It is no exaggeration to conclude that anything good I accomplish is a direct result of their love and support. My grandparents, Bill and Doris, may be the first Jewish grandparents in history who, upon hearing that the grandson they sent to college as a pre-med had changed plans and become a sociology major, reacted with wholehearted enthusiasm, never once questioning my choice or flexing their guilt-muscles. They are always the first to ask for page proofs when I write something new and they keep a steady stream of news clippings related to my research flowing into my mailbox. As a modest, wholly inadequate gesture of appreciation for their devotion and support, I dedicate this dissertation to them.

My wife, Leah, is my inspiration in every single sense. Our daughter, Elina, fills my life with ever-increasing joy and wonder. Popular opinion suggests that grad school is not supposed to feel like the most delightful time in a person's life, yet the two of them have made the past few years precisely that.

I gratefully acknowledge the Department of Sociology, the Graham family, The Penn State Quantitative Social Science Initiative, and the faculty who devoted research funds to my support for their contributions to my graduate studies. I could not have completed this project without the help of the PRI Data Core, who maintained the ECLS-K data and computing resources I used. Also, this research was supported by a grant from the American Educational Research Association which receives funds for its "AERA Grants Program" from the National Science Foundation and the National Center for Education Statistics of the Institute of Education Sciences (U.S. Department of Education) under NSF Grant #DRL-0634035. Opinions reflect those of the author and do not necessarily reflect those of the granting agencies.

CHAPTER ONE

Background & Introduction

The Stratification of Early Academic Outcomes

The initial years of schooling wield a substantial influence on individuals' ultimate academic achievement, educational attainment, and labor market success (Alexander and Entwisle 1998; Entwisle et. al 1997; Hart and Risley 1995; Kerckhoff and Glennie 1999; Stanovich 1986). Students who are well prepared to achieve in the first few years of school tend to enjoy continued success (Alexander and Entwisle 1988; Entwisle and Alexander 2002), and research has repeatedly indicated that the gap between high- and low-achievers grows over time (Boardman et al. 2002; Farkas and Beron 2004; Phillips, Crouse and Ralph 1998).

Early academic performance is strongly related to the family contexts into which children are born. From the earliest stages of life, children begin developing cognitively and socioemotionally, subject to the skills and resources possessed by their caregivers. Families that face human, cultural, or social capital deficiencies are less able to foster their children's development (Duncan, Brooks-Gunn, and Klebanov 1994, Guo and Stearns 2002, Hart and Risley 1995), placing these children at a disadvantage from the very educational "starting gate" (Lee and Burkham 2002).

Inequality in children's earliest academic experiences plays a substantial role in the intergenerational transmission of disadvantage. Academic disadvantage in the first years of schooling is predictive of poor education and labor market outcomes, which are associated with low levels of socioeconomic attainment (Jencks 1972; Sewell, Hauser, and Featherman 1976). Low socioeconomic status (SES) among parents is in turn associated with initial academic disadvantage in the subsequent generation (Duncan et al. 1994), creating an intergenerational feedback loop of disadvantage.

Sociologists of education have turned increasing attention toward the early years of education, with a particular focus on the period preceding the transition to formal schooling. This research indicates that class- and race-based educational inequalities observed among school-aged children are likely rooted in earlier-emerging inequalities in cognitive development. Hart and Risley (1995) demonstrated that social class differences in children's working vocabulary can be identified in children as young as 18 months, and by 36 months of age the children of professional-class parents used more than twice as many words as children from low-income families. These social class discrepancies in language ability persist well into adolescence (Farkas and Beron 2004). Racial and ethnic differences in oral vocabulary have also been found to emerge early in life. Jencks and Phillips (1998) found a black-white gap of approximately one year's vocabulary knowledge among three to six-year-old children, controlling for their families' income and parental education levels. Fuller and colleagues (2009) found that children from Mexican-American and other Hispanic backgrounds demonstrated significantly slower cognitive growth than non-Hispanic white children by 24 months of age, net of relevant family background characteristics.

Racial/ethnic and social class inequalities at school entry have received somewhat more research attention than pre-school differences. Research using national data from the Children of the National Longitudinal Survey of Youth (CNLSY) and Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K) indicates that children demonstrate substantial socioeconomic and racial/ethnic inequalities in oral vocabulary and cognitive ability scores at the outset of schooling (Farkas and Beron 2004, Lee and Burkham 2002). Lee and Burkham (2002) estimate that the children from the ECLS-K's highest family SES quintile score 60% higher on cognitive ability tests at kindergarten entry than students in the bottom family SES quintile. Similarly, the authors find that black and Hispanic children score approximately 20% lower on cognitive tests than non-Hispanic white children at school entry.

Findings regarding pre-school and school-entry inequalities are important to the sociological study of schooling. Investigations of academic inequality cannot focus on whether schools 'create' class and race-based inequalities – these are established before children ever set foot in the classroom. Rather, sociologists examining the school years must focus on determining the degree to which schooling mitigates or exacerbates these pre-existing inequalities.

The kindergarten and first grade curriculum constitutes a foundation-laying enterprise; children are taught the fundamental tools of literacy and numeracy upon which the development of future knowledge and skills depends. As soon as children begin schooling they are expected to acquire this fundamental knowledge at an extraordinarily rapid pace. For example, Jencks (1985) estimated that the average rate of learning during first grade was ten times greater than the average learning rate in high school. Children who struggle during this period of rapid acquisition of fundamental knowledge due to a lack of basic skills can be expected to face substantial obstacles to future academic achievement, while children who are already familiar with the early academic curriculum are well situated to acquire more advanced skills and knowledge.

Evidence suggests that racial/ethnic and social class inequalities in school readiness lead to inequalities in academic achievement growth over the elementary school years. Data from Entwisle and Alexander's Beginning School Study (BSS) provided some of the first longitudinal estimates of elementary school inequality. In analyses of BSS data focusing on black-white and low-high SES gaps in reading and mathematics ability (Entwisle and Alexander 1992, 1994; Alexander, Entwisle and Olson 1997, 2001) the authors found that black and white children's test scores tended to diverge over time, with black students falling increasingly behind over the elementary school years. A similar pattern emerged among children from low-SES families, whose reading and mathematics achievement trajectories were flatter than those of students from higher-SES backgrounds. In other words, those students who entered school at an academic disadvantage grew increasingly disadvantaged over the elementary school years, suggesting that schooling exacerbates initial race/ethnicity and class-based academic inequalities.

Several other sociologists have identified similar trends in racial/ethnic achievement gaps. Phillips and colleagues (1998) conducted an analysis of the black-white test score gap using multiple waves of data from 8 large-scale studies. The authors concluded that black and white children's test scores diverge over time, and nearly all of this divergence occurs before high school. The consequences of achievement differences at school entry on black-white test score divergence were quite large: the authors' estimates suggested that over half of the black-white test score gap at the end of twelfth grade could be eliminated by equalizing reading and mathematics achievement at the beginning of first grade (Phillips et al. 1998).

Boardman and colleagues (2002) examined reading and mathematics achievement growth in children between the ages of 6 and 14 (approximately the same age range analyzed in Chapter 4 of the present study) using National Longitudinal Study of Youth (NLSY) data. The authors found statistically robust differences between non-Hispanic white, black, and Mexican children, indicating that the mathematics and reading scores of Mexican and black students trailed those of white students. Furthermore, the authors found that the achievement gap between Mexican and non-Hispanic white students remained stable over time, while the black-white gap grew over the elementary and middle school years. This longitudinal trend in racial/ethnic achievement inequality was also demonstrated by Downey and colleagues (2004) and Fryer and Levitt (2004). Both studies examined ECLS-K data and concluded that black children's test scores declined over the first two years of schooling relative to the scores of non-Hispanic white children, while gaps from white children remained constant over time for members of other racial/ethnic groups.

Asian children's early academic achievement has been less frequently examined than other racial/ethnic groups. However, recent research indicates that Asian children have comparable or higher levels of academic achievement at school entry than non-Hispanic whites, and Asians' achievement grows at a comparable rate as well (Fryer and Levitt 2004; Glick and Hohmann-Marriott 2007; Han 2006; Palacios, Guttmannova, and Chase-Lansdale 2008).

The empirical evidence is abundant and clear: children's academic performance at and prior to school entry varies along racial/ethnic and social class lines, with high-SES, some Asian, and non-Hispanic white children demonstrating achievement advantages over low-SES and black or Hispanic children. Moreover, these initial achievement differences correspond to gaps in academic performance in subsequent years of schooling. Achievement gaps appear to increase over time for black and low-SES children relative to whites and high-SES children, while the more limited evidence for Hispanic and Asian children generally does not suggest such over-time achievement divergence.

The research literature on inequalities in pre-secondary education converges on several key conclusions, which are discussed at greater length in the chapter previews below. In spite of the progress that has been made, however, our understanding of academic inequalities at school entry and over the course of the elementary and middle school years is far from complete, because sociologists of education have a long history of framing educational inequality within a black-white racial dichotomy.

However, American society is becoming increasingly multiethnic as a result of large-scale immigration from Asian and Latin American countries. As racial and ethnic diversity in American society increases, so too does the diversity of academic experiences of children from various social groups. The present study focuses attention on the influences of this increasing racial diversity as well as the influences of immigrant generational status and national origin group affiliation. It examines how these factors influence children's cognitive and socioemotional school readiness, academic ability growth from kindergarten through eighth grade, and academic self-concept prior to the transition to high school. In doing so, this study expands our evidence-based understanding of racial/ethnic variation in children's pre-secondary educational experiences to better reflect an America that is being rapidly and profoundly reshaped through immigration. This immigration-related growth is illustrated by the fact that over half of Hispanic youth and 9 in 10 Asian youth are the children of immigrant parents (Zhou 1997). Understanding the full range of educational inequality that stems from race/ethnicity requires a greater emphasis on the important role that immigration and generational status play in these inequalities.

Immigration to the United States since 1965

Despite being frequently described as a "nation of immigrants", contemporary American society has taken a particularly ambivalent stance toward immigration. As public and political debate continue over how many and what type of foreign-born individuals ought to be permitted to take up residence in the U.S., well over one million immigrants per year do just that (White and Glick 2009). High levels of immigration have led to a dramatic increase in the share of the U.S. population that is foreign-born, rising from 5 percent in 1970 to 12 percent in 1993 (Capps et al. 2004). This immigration occurs in authorized and unauthorized forms, with recent data suggesting that the annual number of unauthorized arrivals exceeds the number of documented arrivals (Passel 2005).

Scholars generally trace the beginning of the contemporary era of United States immigration to the Immigration and Naturalization Act of 1965, which eliminated preexisting national origin quotas that discriminated against immigrants from certain regions, Asian countries in particular. The dismantling of the quota system contributed to the characteristic that, to many observers, defines contemporary immigration: the change in the national origins of United States immigrants away from European countries toward a decidedly Asian- and Latin American-heavy immigrant flow.

For example, in the ten years leading up to the Immigration Act of 1965, European immigrants constituted over half of the immigrant population, Asian immigrants less than 10 percent and Latin American immigrants roughly 20 percent. By contrast, in the 1990s Europeans accounted for less than 15 percent of all immigrants while documented immigration from Latin America accounted for over 50 percent of all immigration (with half of this figure being attributable to documented Mexican immigration alone), and Asian immigration accounted for roughly 30 percent of the total immigrant flow (Alba and Nee 2003, White and Glick 2009). Only two of the top fifteen immigrant origin countries from 1996 to 2000 are found outside of Asian and Latin America: Russia and Ukraine, each of which accounted for about 2 percent of the total documented immigrant flow. The modal immigrant origins during this time period were Mexico, which produced 20 percent of total documented immigration, and Philippines, China, and India, each of which produced about 5 percent each of total documented immigration (Alba and Nee 2003).

The shift in immigrant national origins since 1965 has led to a contemporary immigrant population composed overwhelmingly of individuals whose race and ethnicity place them in the minority in the United States. However, members of immigrant families comprise 20 percent of the under-18 population of the United States (Hernandez 1999), and 22 percent of the population under age 6 (Capps et al. 2004). As these young people age, the coming decades will see an increasing share of the population composed of non-white offspring of immigrant parents, with the non-Hispanic white population projected to dip below 50 percent of the total U.S. population for the first time between 2040 and 2045 (U.S. Census Bureau 2008).

While large-scale demographic changes promise to reshape the American ethnic landscape in the near future, as of the first decade of the 21st century the Unites States still possesses a distinct non-Hispanic white cultural mainstream. Within the United States' social-historical context of racial/ethnic inequality in which non-white individuals frequently encounter structural disadvantage, racial/ethnic minority status may play a profound role in shaping the assimilation[1] pathways of contemporary immigrants and their children. For contemporary immigrants, intergenerational assimilation into American society may take many forms, not all of which are necessarily positive.

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[1] Throughout the present study, I use the term *assimilation* to refer to a decline in differences between members of a given immigrant group and a particular segment of American society across generational time. In the present study, the differences in question relate broadly to the status attainment process, and specifically to academic success. The present study does not examine cultural assimilation. For a thorough treatment of this 'declining differences' perspective on assimilation, see Alba and Nee (2003).

The notion that assimilation may occur along multiple, divergent pathways is a rather recent development in assimilation theory. This concept is most frequently referred to as *segmented assimilation* (Portes and Rumbaut 2001, Portes and Zhou 1993, Zhou 1999). Segmented assimilation theory provides a more flexible view of the cross-generational assimilation process than earlier theoretical perspectives that tended to either overstate (e.g., the 'melting pot' perspective) or understate (e.g., the 'stewpot' or 'salad bowl' perspective, ethnic pluralism) the degree to which immigrant ethnic groups and the receiving society are likely to converge in response to ethnically and culturally diverse immigration. A parallel shortcoming of earlier assimilation theory was its tendency to ignore the salience and stability of distinct dominant and underclass segments of American society, as well as the structural conditions responsible for their creation and perpetuation (e.g., the Chicago school's 'contact hypothesis', 'straight-line' assimilation theory). These earlier theories assumed that assimilation would invariably lead toward a sole social destination: the American mainstream.

Segmented assimilation theory provides a perspective that, while perhaps lacking the rosy aura of a straight-line assimilation model[2], acknowledges a reality in which the life chances of immigrants and their children are shaped and constrained by the interplay between their race and ethnicity, their stocks of human, cultural, and social capital and the social-historical contexts in which they settle (Portes and Rumbaut 2001; Zhou and Xiong 2005). In particular, immigrants' cultural and ethnic identities and

[2] Alba and Nee (2003) offer a thoughtful critique of segmented assimilation theory as being overly deterministic and, therefore, for dark-skinned immigrants in particular, unnecessarily pessimistic (see 161-166).

resources permit access to varying opportunities depending on the receiving society's preexisting racial and ethnic relations. In the United States, this means that immigrants who bear a cultural, linguistic, or phenotypic resemblance to members of historically marginalized, non-mainstream groups (African Americans especially) are likely to assume the constrained educational and occupational opportunities characteristic of the American minority experience.

Assimilation into the American mainstream represents just one of multiple possible assimilation trajectories, with assimilation into a historically disadvantaged segment of the population being the road more often traveled by members of certain minority immigrant groups (Gans 1992; Portes and Zhou 1993; Waters 1990). The outcomes associated with immigration depend to a large degree on the racial/ethnic identity of the person or group in question. In the parlance of quantitative social research, evidence suggests that race/ethnicity *moderates* the effect of immigrant status on social mobility.

While race and ethnicity undoubtedly shape immigrants' assimilation trajectories, it would be a mistake to view these ascribed characteristics in an overly deterministic light. Even for members of otherwise disadvantaged immigrant groups, high levels of educational achievement and attainment may play an important role in ensuring positive assimilation trajectories. Indeed, research suggests that immigrant children's educational success tends to go hand-in-hand with intergenerational trajectories of upward social mobility and positive assimilation (Suarez-Orozco and

Suarez-Orozco 2001, Zhou 1997). With this in mind, discussion will now turn to the topic of educational variation among the children of contemporary American immigrants.

Educational Experiences of Contemporary Immigrants

As a primary engine of social stratification, schooling plays a central role in dictating the assimilation and social mobility outcomes of the children of immigrants. For immigrant families who are thrust into the American status attainment machine bearing many of the disadvantages linked by prior research to poor educational outcomes (Bean and Tienda 1987), resilience in fostering children's positive developmental and scholastic outcomes is a crucial step in solidifying an upward intergenerational assimilation trajectory (Suarez-Orozco and Suarez-Orozco 2001, Zhou 1997).

Research on generational status differences in children's academic performance generally supports the conclusion that children of immigrant parents have higher levels of academic achievement than third-plus generation children. This pattern has been demonstrated among Hispanics (Hirschman 2001; Matute-Bianchi 1986; Padilla and Gonzalez 2001; Portes 1995; Portes and MacLeod 1996; Rumbaut 1994, 1995), Asians (Gibson 1993; Glick and White 2003; Kao and Tienda 1995), and blacks (Kao 2004; Thomas 2009).

Kao and Tienda (1995, 1998) explain immigrants' high levels of achievement and aspirations through their *immigrant optimism* hypothesis. This theoretical perspective suggests that immigrant families possess a dual frame-of-reference, drawing continuous comparisons between the opportunity structures of their origin countries and the

United States. The relative openness of the American opportunity structure promotes optimistic attitudes among students and, perhaps more importantly, their parents. Immigrant parents perceive the potential for enormous social mobility through educational success in the United States, and work diligently to instill similar attitudes in their children. This optimistic characteristic of immigrant families is further enhanced through international migration's self-selection effect: the perception of greater opportunity provides the impetus for many families' decision to migrate, which serves to select into the immigrant population those who are most optimistic toward their life chances in the United States (Palloni and Morenoff 2001).

In addition to documenting the relatively high levels of educational performance and aspirations among first and second generation children, the research literature on immigrant children's academic experiences underscores the divergent achievement outcomes of those from different racial/ethnic and national origin backgrounds. Asian immigrant children are widely reported to demonstrate higher levels of academic performance (particularly in math and science), grades, and educational attainment than children from other racial/ethnic backgrounds (Kao 1995; Portes and Rumbaut 1990; Schneider and Lee 1990; Zhou and Bankston 1994). This characteristically high achievement has led some to stereotype Asian children as the "model minority" – living proof that minority status need not imply poor outcomes (Blair and Quian 1998; Kao 1995)[3].

[3] The "model minority" stereotype stems from the misguided conclusion that *all* Asian students excel in school and the labor market. This is not an accurate portrayal of the heterogeneity that exists within the

Asian educational success, including very high educational aspirations (Kao and Tienda 1998; Goyette and Xie 1999), is typically explained as an effect of a shared cultural emphasis on education, transmitted to youth through between- and within-family social capital[4] (Hao and Bonstead-Bruns 1998; Schneider and Lee 1990). Parents, teachers, and co-ethnic community members often hold especially high expectations for Asian students' academic performance (Goyette and Xie 1999; Louie 2001; Schneider and Lee 1990). In addition, research identifies Asian cultural norms emphasizing "quiet, industrious, disciplined, and orderly behaviors" (Schneider and Lee 1990:374) as a driving force behind Asian immigrants' high levels of academic performance. Teachers immediately recognize these cultural habits as the hallmark of a 'good student' and regard Asian children accordingly[5].

Unlike Asian children, Hispanic children tend to demonstrate less favorable academic outcomes than members of other ethnic groups in the United States. Hispanics' educational outcomes indicate that they are the least educated major population group in the United States (Mickelson 2002). These educational outcomes include lower test scores, lower grades, and higher attrition rates (Bean and Tienda 1987; Landale et al. 1998; Portes and Rumbaut 2001; Velez 1989; Warren 1996).

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pan-ethnic 'Asian" category, however. For example, Cambodian, Hmong, and Laotian students often experience severe educational disadvantages (Mickelson 2002, Yang 2005).

[4] While "social capital" terminology is not universally employed in the literature, there is wide support for notion that close parental monitoring and involvement in children's schooling (labeled "within-family social capital" by Hao and others) anchors Asian children's high performance.

[5] While this perspective is the dominant explanation for Asian academic success, it is by no means t the only one that has been put forth. For example, Sue and Okazaki (1990) consider Asians' pro-education cultural characteristics an *effect* as well as a cause of their social location. The authors suggest that alternative avenues to social mobility in the United States have been blocked for Asians, leaving educational success as their only viable route to status attainment. From this perspective, Asians' seemingly singular focus on education is at least in part a product of their bounded mobility opportunities.

Substantial heterogeneity within the Hispanic population exists, however. For example, children of Cuban immigrants tend to demonstrate comparatively high levels of academic achievement and attainment (Portes and Rumbaut 2001; Velez 1989), while Mexican and Puerto Rican immigrant children often demonstrate lower levels of academic success (Oropesa and Landale 2000; Rumberger and Larson 1998; Warren 1996). However, this intra-ethnic heterogeneity is frequently obscured in studies that do not disaggregate the Hispanic population by national origin (e.g., Palacios et al. 2008).

Hispanic immigrant children are more likely than non-Hispanic white or Asian children to face family disadvantages linked to educational difficulties, such as low family income, low parental education, high numbers of siblings, and English deficiency (Driscoll 1999; Glick and White 2003, Velez 1989). A “socioeconomic” or “human capital” perspective (Rumberger and Larson 1998) focusing on these family background disadvantages is most often employed to explain the low educational performance levels of Hispanic immigrant children. For example, Kao and Tienda (1995) find that parental SES explains test score and course grade gaps between immigrant and native Hispanic eighth graders.

With the centrality of academic achievement to the intergenerational status transmission and structural assimilation processes firmly in mind, the present study proceeds from the perspective that minority immigrant groups’ average levels of school readiness, elementary and middle school academic ability growth, and adolescent academic self-concept may serve as indicators of the extent to which individuals sharing common ethnic and national origin backgrounds are poised to achieve upward social mobility in the United States.

Each analytic chapter of the present study focuses on a different academic outcome. In Chapter 3, I examine patterns of low cognitive and socioemotional school readiness. This analysis provides estimates of the amount of variation in children's preparedness to begin formal schooling that is associated with race/ethnicity, national origin, and generational status, net of an array of family context characteristics. Chapter 4 examines cognitive ability growth from kindergarten entry through the conclusion of eighth grade. In this chapter, I examine children's skill acquisition over the elementary and middle school years, paying particular attention to racial/ethnic, generational status, and national origin differences in individuals' ability growth trajectories. The final analytic chapter, Chapter 5, considers variation in children's academic self-perceptions as they prepare to enter high school. These social-psychological measures provide an alternative to standardized test measures of academic success, and analyses reveal patterns of racial/ethnic, national origin, and generational status variation in academic self-concept that are distinct from variation in academic achievement. These outcomes are described in greater detail in the chapter previews below.

Taken as a whole, the present study provides a portrait of elementary and middle school educational inequality experienced by racial/ethnic minority and immigrant children. From their cognitive and behavioral preparedness to enter kindergarten, through their reading and mathematics ability gains over the elementary and middle school years, and finally to their self-perceived academic competence at the transition to high school, the present study identifies and explains important sources of academic variation during the most influential educational period in an individual's life.

The demographic landscape of the United States continues to be reshaped by large-scale immigration. In light of this fact, the present study's focus on children from immigrant families provides an important contribution to our knowledge regarding contemporary educational inequalities. Perhaps more importantly, however, this study suggests patterns of inequality that may become increasingly pronounced as the United States undergoes a significant demographic shift over the coming years. Without a clear understanding of the challenges facing the children, families, and schools impacted by immigration, attempts to mitigate impending educational inequalities cannot succeed.

Chapter Previews

Chapter 2: Data & Methods

Chapter 2 introduces the data and analytic methods employed in subsequent chapters. The chapter includes an introduction to the ECLS-K, the study from which the data were obtained. Chapter 2 also includes a description of the key variables examined in Chapters 3, 4, and 5, and an in-depth discussion of the statistical modeling approaches used.

Chapter 3: School Readiness

Chapter 3 investigates variation in children's cognitive and socioemotional school readiness associated with race/ethnicity, national origin, and generational status. As discussed above, research strongly implicates the very earliest stages of children's academic careers as a prominent influence on their subsequent success in school and beyond (Alexander and Entwisle 1993, 1998; Entwisle et. al 1997). Inequalities in school readiness, therefore, may serve as early indicators of the patterns of educational inequality that evolve as schooling proceeds.

Children are ready to begin formal schooling when their cognitive and social skills are sufficient to meet the demands of the classroom environment. Chapter 3 conceptualizes school readiness along four domains: literacy readiness, numeracy readiness, general knowledge readiness, and socioemotional/behavioral readiness. Pre-school children acquire these cognitive and social skills in their childcare settings, subject to the influences of their adult caregivers' resources and skills (Campbell and von Stauffenberg 2008; Landry and Smith 2008; Magnuson and Waldfogel 2005).

Prior analyses of school readiness inequalities using ECLS-K data indicate that black and Hispanic children face disadvantages relative to Asians and non-Hispanic whites, and children of immigrant parents tend to have higher levels of school readiness than coethnic children of U.S.-born parents (e.g., Brooks-Gunn and Markman 2005; Duncan and Magnuson 2005; Farkas and Hibel 2008; Lee and Burkham 2002). These studies also suggest that socioeconomic, racial/ethnic, and cultural capital differences between families account for a bulk of the variance in children's school readiness levels. Studies of early cognitive and educational development indicate that families with fewer socioeconomic resources tend to demonstrate lower oral vocabulary usage and direct cognitive skill instruction in the home (Hart and Risley 1995; Farkas and Beron 2004), higher levels of family distress, leading to harsher and less responsive parenting (Duncan, Brooks-Gunn, and Klebanov 1994; Landry and Smith 2008), and less parental involvement in structured educational activities (Lareau and Weininger 2008). In part because low family SES is more prevalent among racial/ethnic minority and immigrant families (White and Glick 2009), the cognitive and socioemotional school readiness of children from these families may be lower as well.

Chapter 3 focuses on the following research questions:

(1) How do racial/ethnic minority children of immigrant mothers compare to children of native-born mothers in terms of their readiness to succeed in school?

(2) Which minority immigrant groups tend to arrive in the United States well-prepared to achieve educational success, and which groups face the steepest disadvantages?

(3) What factors explain school readiness differences between white and non-white children, as well differences between co-ethnic children of foreign- and native-born mothers?

The first two research questions are descriptive in nature. Question 1 involves within-group school readiness comparisons of the children of foreign- and native-born mothers, while Question 2 involves comparisons between racial/ethnic and national origin groups.

Question 3 investigates the factors associated with school readiness inequalities. By statistically controlling for measures of family economic, human and cultural capital, and parental involvement, the analyses presented in Chapter 3 estimate the effects of these oft-mentioned sources of family academic influence on immigrant children's likelihood of arriving at kindergarten with low levels of school readiness. The axiomatic finding that family socioeconomic background is the most powerful determinant of children's early educational success implies that the children of foreign-born mothers will demonstrate lower levels of school readiness than their third-plus generation coethnic counterparts and that members of relatively more resource-rich immigrant groups should demonstrate higher levels of school readiness than more disadvantaged immigrant groups. However, researchers frequently find that first and second generation children demonstrate better health and education outcomes than children of native-born parents despite possessing disadvantageous background characteristics, a finding some refer to as the "immigrant paradox" (Hummer et al. 2007; Palloni and Morenoff 2001; Palacioset al. 2008). The present study aims to identify those immigrant groups whose school readiness outcomes reflect the typical positive relationship between family resources and academic success as well as those immigrant groups whose patterns of school readiness are indeed "paradoxical".

Despite the existence of separate, well-developed streams of research highlighting the importance of immigrant status, race/ethnicity, and school readiness in the social mobility process, surprisingly little research has been conducted that combines these three foci. Those studies that have examined school readiness among the children of immigrants are limited by a lack of attention to the breadth of school readiness indicators, inattention to racial/ethnic and national origin diversity among the children of immigrants, or a combination of both limitations.[6]

Recent research comparing school readiness levels of immigrant and non-immigrant children suggests that those born to immigrant parents demonstrate lower (Crosnoe 2006, 2007; Magnuson, Lahai, and Waldfogel 2006) or statistically equivalent (Palacios et al. 2008) levels of early achievement. Crosnoe's (2006, 2007) research on Mexican immigrant families and their children's school readiness used ECLS-K data to examine math achievement at kindergarten entry and at the end of first grade, finding that Mexican children from immigrant families began kindergarten and finished first grade with significantly lower mathematics proficiency than non-Hispanic white, Asian, or other Hispanic students, while their test scores were statistically equivalent to those of African American students. These gaps were largely (but not completely) accounted for by family socioeconomic status, child's self-regulation, and, to a lesser extent, assorted measures of parental involvement, school context, and child's physical health.

Using ECLS-K data, Magnuson and colleagues (2006) conceptualized school readiness along three dimensions: English proficiency, reading ability, and mathematics ability, and reported 15 percent lower scores among children with immigrant parents compared to those with non-immigrant parents. Examining the same data set, Palacios and colleagues (2008) concluded that first and second-generation children's early

[6] To be fair, it is perfectly legitimate for researchers to take on a narrow empirical focus. My goal in pointing out these limitations is not meant as an out-of-hand condemnation of prior research, but is instead intended as an illustration of the fact that a gap in the body of knowledge exists: one that is filled by the present wide-ranging study and its multi-dimensional conception of school readiness.

reading achievement[7] did not differ significantly from that of third-plus generation children. However, Magnuson and colleagues did not examine variation associated with children's race/ethnicity in their models despite analyzing data from the ECLS-K, which contains a wealth of such information. Palacios and colleagues examined race/ethnicity as a covariate, but did not distinguish between immigrant children from different national origin backgrounds in their analysis, nor did they examine differences in generational status effects across race/ethnic groups[8]. In light of the thoroughly documented educational inequalities that exist between children from different racial/ethnic and national origin backgrounds, these omissions complicate the interpretation of the studies' results.

Glick and Hohmann-Marriott (2007) conducted a study that is in many ways similar to the analysis presented in Chapter 3. They analyzed ECLS-K data, examined the separate effects of generational status, race/ethnicity, and national origin, and grounded their study in segmented assimilation theory[9]. However, the authors' outcomes of interest are children's mathematics achievement test scores in third grade and the change in these test scores between first and third grade, as opposed to ability

[7] The authors examined achievement at the end, rather than the beginning of kindergarten, for unspecified reasons. Thus, the outcome is not technically a measure of school readiness, as it reflects knowledge gained in school as well as prior to school entry.

[8] The authors explained that concerns regarding sample size and model complexity precluded these analyses. However, I and other researchers (e.g., Durham 2007; Glick and Hohmann-Marriott 2007, Reardon and Galindo 2006, 2007) have not encountered such problems when analyzing the ECLS-K.

[9] In light of the similarities between the present study and Glick and Hohmann-Marriott's (2007) article, it may be worth mentioning that the results from the present study were presented at a professional meeting and submitted for eventual publication prior to Glick and Hohmann-Marriott's article being published (see attached vitae). Given the typically lengthy peer review process, however, Glick and Hohmann-Marriott's manuscript had almost certainly already been submitted for publication by the time results from my study were made public. The overlap between the two studies, therefore, appears coincidental.

measures at school entry. This represents a significant conceptual difference between Glick and Hohmann-Marriott's work and the current study.

Because school readiness cannot, by definition, be a product of schooling, examining school readiness as a dependent variable allows researchers to avoid certain endogeneity problems inherent in studies of educational inequality measured after schooling has begun. The children of immigrants, like racial/ethnic minority and lower-SES children of native-born mothers, tend to attend schools that, for many reasons, may be less effective in educating students than schools attended by non-Hispanic white and higher-SES children, on average (Crosnoe 2005; Fryer and Levitt 2004)[10]. Examining inequality in school *readiness* rather than school *achievement* isolates the influence of children's family and community backgrounds from the confounding effects of differential school quality.

Glick and Hohmann-Marriott (2007) conclude that substantial racial/ethnic and national origin variation in early mathematics achievement exists among children of immigrants. Mexican, Puerto Rican, Central American, Caribbean, and Laotian/Cambodian immigrant children scored significantly lower on mathematics ability tests than non-Hispanic white students of native-born mothers. The third grade mathematics scores of Chinese, East Asian, Vietnamese, Indian, and European immigrant children, however, exceeded those of third-plus generation non-Hispanic whites. In their test of the relative strength of effects, they conclude that race/ethnicity exerts a larger impact on early academic achievement than generational status.

[10] Glick and Hohmann-Marriott (2007) do not adjust their analyses for between-school differences.

The studies reviewed above have been of relatively narrow scope, examining one or two dimensions of early school performance (Crosnoe 2007; Glick and Hohmann-Marriott 2007; Palacios et al. 2008), failing to account for racial/ethnic diversity among children in the United States (Magnuson et al. 2006) or focusing on a single racial/ethnic immigrant group (Crosnoe 2006, 2007). In addition, the most inclusive study (Glick and Hohmann Marriott 2007) examines academic performance in mid-elementary school, allowing (but not accounting) for the potential of between-school differences to bias their results. Thus, a gap exists in the research literature, as no extant study has examined patterns of generational status, racial/ethnic, and national origin inequalities across multiple dimensions of school readiness. Chapter 3 directly addresses this knowledge gap.

Chapter 4: Kindergarten through Eighth Grade Ability Growth

Chapter 4 comprises a longitudinal assessment of children's academic ability trajectories from school entry through the end of the eighth grade year, paying specific attention to ability level and growth rate differences between racial/ethnic and national origin groups as well as generational status differences within these groups. Whereas Chapter 3 identifies those race/ethnic, immigrant, and national origin groups that are more and less successful in promoting their children's pre-school cognitive and socioemotional development, Chapter 4 extends the line of inquiry to follow children's reading and mathematics ability development through the conclusion of middle school.

Chapter 4 addresses three research questions:

(1) How does kindergarten through eighth grade ability growth vary from one child to another, and what proportion of this variation resides within children, between children, and between schools?

(2) Can race/ethnicity, national origin, and generational status account for any predicted differences in children's reading and mathematics ability trajectories?

(3) Do immigrant enclaves play a role in shaping the academic ability growth of the children of foreign-born and native born mothers?

With respect to Question 1 above, I hypothesize that the majority of total variance in children's reading and mathematics ability growth exists between children in the same schools, and a much smaller portion resides between schools. This pattern of variance partitioning is supported by prior research using a multilevel growth modeling approach (e.g., Cheadle 2005, Downey, von Hippel, and Broh 2004), as well as sociological theory on the relative influence of family and school effects dating back at least to the Coleman Report's release in 1966.

Also related to Question 1, I hypothesize that Asian and non-Hispanic white children have higher levels of initial reading and mathematics ability and steeper ability growth trajectories than children from Hispanic and non-Hispanic black families. This is in line with research indicating non-Hispanic white and Asian students' tendency to demonstrate higher levels of academic achievement than other racial/ethnic groups in the United States (Blair and Qian 1998; Kao 1995; Portes and Rumbaut 1990).

In terms of generational status differences, I hypothesize that among the children of foreign-born mothers, Asians will have the highest levels of initial ability and ability growth, while Mexican and Puerto Rican children will demonstrate the lowest initial ability levels and flattest growth trajectories. Again, I draw this hypothesis from evidence that Asian immigrants are more academically successful than their Mexican and Puerto Rican immigrant counterparts who face steep disadvantages (Bean and Tienda 1987; Kao 1995; Oropesa and Landale 2000; Rumberger and Larson 1998; White and Glick 2009; Warren 1996).

Within racial/ethnic and national origin categories, I hypothesize that foreign-born/native-born-mother differences will vary across groups. For racial/ethnic and national origin groups who typically follow upward assimilation trajectories (e.g., non-Hispanic whites, Asians, Cubans), I expect to find significantly higher initial ability levels and more rapid rates of ability growth among the children of native-born mothers than children of foreign-born mothers. For groups considered to be at greater risk of downward assimilation (e.g., non-Hispanic blacks, Puerto Ricans), I expect to find the opposite pattern: higher initial ability and more rapid ability growth among first/second generation children than third-plus generation children.

With regard to Question 3 above, I hypothesize that generational status differences in families' economic, human, and cultural capital will explain a significant portion of generational status differences in children's initial reading and mathematics ability, as well as differences in rates of K-8 ability growth. Likewise, I expect racial/ethnic differences in family resources to explain a substantial share of any observed racial/ethnic gaps in initial academic ability and ability growth rate.

Neither academic achievement nor intergenerational assimilation occurs in a social vacuum. Segmented assimilation involves continuous reciprocal influence between immigrants' individual characteristics (i.e., human, social, and cultural capital) and the broader social contexts where assimilation takes place (Portes and Rumbaut 2001; Portes and Zhou 1993). Immigrant groups that encounter socially and economically inclusive contexts experience favorable assimilation outcomes compared to immigrant groups in contexts characterized by constrained opportunities, mistrust, or hostility.

One strategy for counteracting less-than-ideal contexts of immigrant incorporation has been for ethnic minority immigrant groups to establish their own culturally, economically, and geographically distinct ethnic enclave communities. Portes (1981:291) defines immigrant enclave economies as consisting of "immigrant groups which concentrate in a distinct spatial location and organize a variety of enterprises serving their own ethnic market and/or the general population." These immigrant enclave communities serve to insulate members of the minority immigrant community from downward assimilation pressures, providing opportunities to gain economic and educational footholds that might not be as readily available in broader society.

This is not to suggest that immigrant enclaves yield exclusively beneficial outcomes. Perceived "clannishness" among enclave residents can lead to hostility from the surrounding population (Portes and Manning 1986). Poor immigrant enclave communities may also foster reactive, oppositional subcultures, particularly among second generation youth (Matute-Bianchi 1986). In these cases, immigrants with a connection to a firmly established enclave community may be worse off than those with connections to a nascent immigrant community that has not existed long enough to foster oppositional subcultures (Gibson 1987), and may even be worse off than immigrants with no co-ethnic community at all (Portes and Zhou 1993).

On the whole, research on the role played by social context in shaping immigrants' assimilation outcomes suggests that, for the children of immigrants, embeddedness in an ethnic immigrant community may provide educational benefits in the form of higher levels of achievement and higher educational aspirations (Kao 1995, Zhou and Bankston 1998). In light of this research, I hypothesize that community immigrant concentration will be associated with higher initial reading and mathematics ability and, to a greater extent, higher levels of ability growth across the school years. I also hypothesize that measures of school-levels disadvantage (i.e., low-SES and minority enrollments) will be negatively associated with all children's initial reading and mathematics ability, as these school context variables should serve as proxy measures of neighborhood disadvantage during the pre-school years. In addition, I hypothesize that high enrollments of low-SES and non-white students will be associated with slower reading and mathematics ability growth over the K-8 period. By accounting for measures of community and school composition, the statistical models presented in Chapter 4 should explain a greater share of the variation in academic achievement trajectories than models that do not account for these contextual influences.

Achievement gaps between more and less successful immigrant groups as well as gaps between coethnic children of foreign- and native-born mothers may arise in part from differences in those groups residential and school attendance patterns. The analyses reported in Chapter 4 test the extent to which this mediation takes place.

Most research on educational differences between immigrant and native students focuses on outcomes measured in high school or later (e.g., Bankston and Zhou 1997; Fuligni 1997; Glick and White 2003; Greenman and Xie 2007; Hirschman 2001; Kao and Tienda 1995; Pong, Hao, and Gardner 2005; Thomas 2009; White and Glick 2009). This body of research tends to support an "immigrant superachievement" perspective (White and Glick 2009); that is, due largely to immigrant families' higher motivation to 'get ahead' and their increased emphasis on academic success as a means for doing so, high schoolers with immigrant parents demonstrate higher achievement and aspirations than comparable students with native-born parents.

As sociological attention to early educational inequalities has increased in recent years, the scope of such research has expanded to reflect the increasingly multiethnic composition of the United States. This research tends to demonstrate less inequality in elementary school achievement growth between Asian or Hispanic children and non-Hispanic whites than exists between black and white children (Crosnoe 2006; Reardon and Galindo 2006, 2007). In their analysis of reading and mathematics skills, Reardon and Galindo (2006) found that gaps between non-Hispanic white and Hispanic students tend to narrow over the early years of schooling, especially between school entry and the end of first grade. By contrast, black-white gaps in reading and math skills grow over the course of the K-5 period in both subject areas. Asian students outperformed non-Hispanic white children in both areas at kindergarten entry. By the end of fifth grade, Asian students are further ahead of non-Hispanic whites in terms of their math skills and less far ahead in reading skills compared to their advantages at kindergarten entry. Separating Hispanic children by national/regional origin, the authors found that all groups (Mexican, Cuban, Puerto Rican, Central American, and South American) began school with lower math and reading skills than non-Hispanic whites, but each had also narrowed the gap with white students by the end of fifth grade. By contrast, Crosnoe (2006) found that Mexican children from immigrant families experienced a stable (i.e., neither widening nor narrowing) gap in mathematics achievement relative to non-Hispanic white children between first and third grade.

Reardon and Galindo's work is certainly informative with respect to racial/ethnic variation in early learning trajectories. However, these studies did not intend to examine generational status variation, and therefore cannot inform the present study's examination of generational status differences within ethnic and national origin groups[11].

Leventhal, Xue and Brooks-Gunn (2006) conducted a readily comparable analysis to Chapter 4 of the present study. Examining verbal ability growth from ages 6 – 16 among non-Hispanic white, non-Hispanic black, Mexican, and Puerto Rican schoolchildren from a sample of Chicago neighborhoods, the authors found that non-

[11] In both studies, Reardon and Galindo (2006; 2007) only examined generational status differences among Mexican children, finding significant disadvantages among first and second generation children compared to Mexican children of native-born mothers.

Hispanic white children demonstrated the widest immigrant/non-immigrant gap in growth rate. In addition, Puerto Rican and Mexican children of native-born mothers exhibited higher verbal ability growth rates than those with foreign-born mothers. Black children, on the other hand, demonstrated the opposite pattern: immigrant children demonstrated higher levels of verbal ability than non-immigrant children. The authors found that family socioeconomic background partially explained these inequalities, though neighborhood measures did not contribute any explanatory power.

While the aforementioned study did not find support for the hypothesis that community context exerts an influence on children's verbal ability growth, there is ample reason to expect that present study improves upon the methodology used by Leventhal and colleagues (2006), and as a result, may identify social contextual sources of variation in children's ability growth trajectories. The present study's use of nationally representative data, as opposed to a sample drawn from a single city, should result in greater diversity of social contexts and therefore a greater opportunity for social context to discriminate children's ability trajectories. In addition, the present study considers a wider variety of ethnic immigrant groups, allowing for the examination of greater between-group variation in ability trajectories, as well as the examination of the community contexts inhabited by several different minority immigrant groups (e.g., Asians, Cubans). Finally, it is surprising that the study by Leventhal, and colleagues did not incorporate measures of school context into their analysis of verbal ability growth among school-aged children. The present study remedies this shortcoming, examining the effects of school racial/ethnic and socioeconomic composition on children's reading and mathematics ability growth. As demonstrated by Crosnoe (2005) Mexican children's school poverty and, to a lesser extent, minority enrollment levels contributed to individuals' lower levels of first grade mathematics performance. The same contextual effect could certainly hold over the longer K-8 period, and in reading ability as well as mathematics.

While the studies discussed above represent important steps toward developing a more complete understanding of academic inequality along racial/ethnic, national origin, and generational status lines, the present study promises to advance our knowledge further by benefit of multiple advantages over prior work. By examining ability growth in both reading and mathematics, extending the period of inquiry to cover the time of kindergarten entry through middle school completion, examining generational status differences within multiple immigrant groups, and incorporating measures of school context into the model of ability growth, Chapter 4 makes a unique and potentially valuable research contribution.

Chapter 5: Adolescent Academic Self-Concept

Chapter 5 provides both a complementary bookend to Chapter 3 and a unique extension of the extant research on immigrant children's educational experiences by examining students' academic self-concepts immediately prior to high school entry. The analyses in Chapter 5 examine the associations between academic self-concept and race/ethnicity, national origin, and generational status. While Chapters 3 and 4 used test scores as indicators of academic success, Chapter 5 takes a different approach to the measurement of success in schooling, directing attention towards respondents' orientations toward education, as well as their understanding of their personal roles within the American schooling institution.

Self-concept comprises a person's self-perceptions, formed through ongoing interactions with the environment and significant others (Marsh 1993; Shavelson, Hubner, and Stanton 1976). An individual's general self-concept is thought to be multifaceted and hierarchical, such that academic self-concept represents one component, and nested within this facet of overall self-concept are self-concept components reflecting distinct subject areas (i.e., verbal/reading self-concept, mathematics self-concept) (Shavelson et al. 1976).

Academic self-concept represents an alternative to achievement test scores as a measure of individuals' academic success and potential. Given standardized tests' widely discussed shortcomings in terms of predictive validity (especially among minority students) (e.g., Fleming and Garcia 1998; Vars and Bowen 1998) and racial and cultural bias (e.g., Jencks 1998; Steele and Aronson 1995), as well as research that suggests academic self-concept is a better predictor of academic success among minority and low-SES individuals than measures of cognitive skills (Gerardi 1990), academic self-concept may provide different and perhaps more appropriate information about the future life chances of the children of immigrants.

High academic self-concept in middle school has been shown to predict positive high school outcomes, including plans to attend college (Murdock, Anderman, and Hodge 2000), lower risk of dropout (Olga and Jason 1993), higher academic effort

(Murdock et al. 2000), higher academic achievement[12] (Marsh 1990), improved educational and career aspirations, and increased probability of college attendance (Marsh 1991).. Research also indicates that, during educational transitions such as the middle-to-high school transition captured in the present study, high self-perceived academic competencies are associated with higher levels of motivation and subsequent school grades among Hispanic students (Zanobini and Usai 2002).

The time period examined in Chapter 5 marks a particularly important transition. Students who successfully complete the eighth grade continue on to a new educational setting: the high school. The high school context represents a larger, less personal, more achievement-oriented school setting than students have previously experienced (Eccles, Midgley, and Adler 1984; Newman et al. 2000). Students who do not adjust well to the high school environment are at much greater risk of low achievement and eventual drop-out than students who experience educational success during their first high school year (Neild, Stoner-Eby, and Furstenberg 2008). Adolescents from urban, racial/ethnic minority, and low-income backgrounds are especially susceptible to academic performance declines following the transition to high school (Newman et al. 2000; Reyes et al. 2000). By examining students' academic achievement (in Chapter 4) and academic self-concept (in Chapter 5) at this critical juncture, the present study identifies those social groups that are best and least prepared to make a successful transition to the higher-pressure learning environment of the high school.

[12] While academic self-concept and academic achievement are reciprocally related, research generally supports the conclusion that self-concept has causal priority over achievement (Marsh 1990, 1992; Skaalvik and Hagtvet 1990).

Chapter 5 examines the following research questions:

(1) How do adolescents' levels of eighth grade verbal/reading and mathematics self-concept vary by race/ethnicity, national origin, and generational status?

(2) To what extent can children's gender, initial academic ability, and family socioeconomic status account for between-child variation in academic self-concept?

(3) Do community immigrant concentration and school racial/ethnic and socioeconomic context explain variation in children's academic self-concepts?

Question 1 is aimed at establishing patterns of inter- and intra-ethnic variation in adolescents' academic self-concept at the conclusion of middle school. With these unconditional differences established, Question 2 takes a first step toward explaining variation in academic self-concept as a function of individual and family background characteristics. Investigating Question 2 involves testing gender, prior academic performance, and family SES as mediators of the effects of race/ethnicity, national origin, and generational status on academic self-concept.

Research Question 3 examines the role of social context in contributing to variation in adolescents' academic self-concepts. Immigrant optimism (Kao and Tienda 1995) and oppositional culture perspectives (Fordham and Ogbu 1986; Matute-Bianchi 1986) suggest that successful immigrant groups derive their academic success in part from strong, tightly knit, pro-educational communities characterized by high levels of social capital. On the other side of the coin are less successful, involuntary immigrant groups, whose immigrant communities may encourage an oppositional stance toward education (Matute-Bianchi 1986). Based on these theoretical perspectives, I hypothesize that Asian children of immigrants will derive academic self-concept benefits from residence in a community with higher levels of immigrant concentration, while children from disadvantaged groups – non-Hispanic black children in particular – will experience negative self-concept effects of residence in an immigrant community.

School minority and low-income enrollments, like community immigrant concentration, are hypothesized be positively associated with adolescents' academic self-concepts. School socioeconomic context has been found to negatively relate to children's academic self-concept (Marsh and Parker 1984). In schools with disadvantaged student populations, individuals' self-concepts are developed relative to a frame of reference in which the "bar has been lowered". By contrast, students in schools with more advantaged student populations are the proverbial "little fish in a big pond", and their self-appraisals suffer as a result of their social comparisons to more advantaged children. In addition, evidence from a study of special education placement suggests that teacher evaluations of students' abilities are subject to the same frame-of-reference contextual effects (Hibel, Farkas, and Morgan in press), and students in high-minority and/or low-SES schools are less likely to receive negative teacher appraisals, net of their own academic performance.

The research literature on academic self-concept variation among immigrant youth is very limited. Mitchell (2005) compared the academic self-concept scores of a sample of 200 first, second, and third-generation black Caribbean adolescents (ages 11-13), finding that those with immigrant parents had significantly higher academic self-concepts than those with U.S.-born parents. This mean comparison comprised the entirety of the analysis; no covariates were examined in the study.

Research carried out in other countries, however, indicates that immigrant students may have lower academic self-concepts than children of native-born parents. This pattern has been demonstrated among Russian immigrants in Greece (Giavrimis, Konstantinou, and Hatzichristou 2003) and Germany (Roebers and Schneider 1999), and Vietnamese refugees in Australia (Klimidis et al. 1994). To the extent that there are universal "immigrant effects" on academic self-concept that exist independent of social context, it is possible that studies conducted in other countries could inform research on academic self-concept formation among immigrants in the United States as well. Given the primacy of social context in shaping immigrants' experiences, however, such a case would be difficult to make.

Sociologists have examined a global self-concept construct (alternately referred to as "self-esteem") more extensively than the domain-specific academic self-concept construct that is the focus of the present study. This research typically converges on findings of very high levels of self-concept/self-esteem among black youth (e.g., Bankston and Zhou 2002; Kao 1998). Studies of immigrant-non-immigrant differences n self-esteem yield less conclusive results, however. Kao (1998) and Harris (1998) examined group differentiation in global self-concept along generational status and racial/ethnic lines, and neither author noted significant differentiation between immigrant and native youth. Bankston and Zhou (2002), however, found that children of immigrants demonstrated lower self-esteem than children of native-born parents.

On the surface, “academic self-concept” and “self-concept/self-esteem” may seem to be roughly equivalent constructs. However, a great deal of research on the measurement and construct validity of these outcomes suggests that they in fact measure wholly different psychological characteristics (see Marsh and Shavelson 1985 for a review of this literature) [13]. Self-esteem or global self-concept is generally found to be either weakly correlated (Hattie 1982) or uncorrelated (Marsh 1986) with academic performance, while domain-specific academic self-concept and subsequent performance correlate much more strongly (Marsh 1986; Marsh, Byrnse, and Shavelson 1988). Research further indicates that academic self-concept has a direct causal relationship with academic achievement (Marsh 1990, 1992; Skaalvik and Hagtvet 1990). All of this suggests that extrapolating from prior research on immigrants' self-esteem to the present study's focus on immigrants' academic self-concept would be fundamentally flawed.

To the best of my knowledge, variation in academic self-concept among adolescents from multiple immigrant groups in the United States has not been examined prior to the present study. In addition, the present study's use of nationally

[13] The measure of self-concept analyzed by Bankston and Zhou (2002), for example, is a scale composed of 6 items measuring adolescents' pride and perceived acceptance, and 1 item measuring their perceived intelligence. By contrast, the measures of academic self concept analyzed in the present study are scales composed solely of items that ask respondents to assess their ability and interest in their schoolwork.

representative, longitudinal data and a regression-based statistical modeling approach stand as advances over prior research. Chapter 5 therefore represents a considerable step forward in the examination of immigrant and non-immigrant adolescents' non-cognitive orientations toward schooling in the United States.

Chapter 6: Conclusion

This chapter summarizes and integrates the results of the preceding chapters. Chapter 6 concludes with a statement of the contributions made by the present study to the fields of social demography, sociology, and education studies, as well as a brief discussion of promising avenues for future expansion of this work.

CHAPTER 2

Data & Methods

Data

With the exception of one U.S. Census-derived variable, the data analyzed in the following chapters are taken from the Early Childhood Longitudinal Study, Kindergarten Class of 1998—99 (ECLS-K)[14]. The ECLS-K focuses on children's school experiences beginning in kindergarten and ending with eighth grade. Drawing on multiple sources and using multiple methods of data collection, the ECLS-K includes information from direct child assessments, interviews with parents, questionnaires administered to children, parents, teachers, and school principals, and official student records. The ECLS-K began following a nationally representative cohort of kindergarteners in the fall of 1998, and subsequent waves of data were collected from the sample in the spring of 1999 (kindergarten), fall of 1999 (first grade), spring of 2000 (first grade), spring of 2002 (third grade), spring of 2004 (fifth grade), and spring of 2007 (eighth grade). The study was developed under sponsorship from the U.S. Department of Education, Institute of Education Sciences, National Center for Education Statistics (NCES).

The ECLS-K employs a multistage cluster sampling design. A sample of 100 counties was drawn and then stratified based on size, racial/ethnic composition, and per capita income. A sample of 1,277 schools offering kindergarten programs was then drawn from the sample of counties. These schools had selection probabilities

[14] This description of the ECLS-K is taken from Tourangeau et al (2009) except where otherwise noted.

proportional to the size of the 1998 kindergarten cohort. The final stage consisted of drawing a sample of children from within each selected school, with a goal of selecting 24 students per school. Asian and Pacific Islander students were oversampled to ensure a large enough sample size for this underrepresented group. The resulting sample consisted of 21,387 children, 19,684 of whom contributed data to the ECLS-K. As researchers have come to expect in longitudinal studies, however, the sample size dropped over successive waves of data collection. Table 2.1 presents the number of children included in each round of data collection. By the spring of the eighth grade year (2007), 8,706 students (41 percent of original respondents) remained in the sample and participated in all waves of data collection. The ECLS-K data include sample weights designed to adjust for initial differential probabilities of selection as well as the effects of attrition and item nonresponse.

[TABLE 2.1 HERE]

Because the ECLS-K follows a single cohort of children over time, the data are only representative of those children who began kindergarten in the United States in 1998. This point is particularly relevant in light of the present study's focus on the children of immigrants. While Chapters 4 and 5 include analyses of student outcomes at the end of eighth grade, students who immigrated to the U.S. at some point after the data collection began (i.e., after kindergarten entry) are not included in the dataset, and the present study's findings can therefore not be generalized to children who immigrated after approximately age five or after fall, 1998.

Analytic Samples

Due to two mitigating factors, each of the three analytic chapters of the present dissertation examines a different subset of the ECLS-K data. The first of these factors is sample attrition, which is described above. Chapter 3 examines child outcomes measured at the first wave of data collection, when all original study participants remained enrolled in the study. Thus, it was possible to make use of a large analytic sample (N = 12,186). However, Chapters 4 and 5 include outcomes measured at the end of eighth grade, by which point attrition had eliminated 59 percent of the original ECLS-K participants. As a result, these analytic data sets were much smaller than the one analyzed in Chapter 3; 7,119 children comprise the Chapter 4 dataset, while Chapter 5's dataset includes 5,045 cases. Attrition bias, which occurs when the respondents who remain in the study differ systematically from those who drop out, has the potential to diminish the study's representativeness and generalizability (external validity) as well as the validity of the observed relationships between variables (internal validity) (Miller and Hollist 2007).

In addition to sample attrition, item non-response contributes to the loss of cases from each analytic sample. Each chapter's analytic sample is restricted to individuals who contributed information to every dependent and independent variable included in the statistical models. Ideally, all analyses would be conducted using the same sample of individuals, ensuring comparability across chapters. Such between-chapter consistency is particularly threatened in cases where item non-response is non-random and thus differentially screens particular types of individuals from the analytic samples (Schafer 1997). A comparison of the descriptive statistics for each analytic dataset suggests that the present study may face limitations on this front. For example, non-Hispanic white children of native-born mothers comprise 62 percent of the sample analyzed in Chapter 3 and 61 percent of the sample analyzed in Chapter 4, but 67 percent of the sample analyzed in Chapter 5.

Adjusting for attrition and non-response bias is the next step in developing the research agenda represented by the present study. This will be achieved through a two-stage process. The first stage consists of using multiple imputation to replace missing values for each case on each chapter's full set of independent variables. Multiple imputation involves the creation of multiple complete data sets containing imputed values for missing data, each of which can be analyzed using standard complete-data methods. The estimates garnered from the separate data sets are then combined into one coherent set of findings (Rubin 1977, 1996). Multiple imputation has the advantage over single imputation of incorporating uncertainty into the standard errors of imputed values by accounting for variance between imputed solutions (Acock 2005; Schafer 1999). Because single imputation approaches assume perfect estimation of imputed values and ignore between-imputation variability, single imputation may result in artificially small standard errors and increased likelihood of type-one errors, particularly when the proportion of missing items is high.

The second stage involves adjusting for attrition bias. Attrition bias may be tested for by estimating a logistic regression in which the dependent variable is a binary indicator of attrition. Using data from the initial wave of the ECLS-K as the set of independent variables, the attrition model estimates the effect of each explanatory variable on the likelihood of dropping out of the study prematurely. Based on this logistic regression model, a predicted probability of attrition, or lambda statistic, can be calculated for each case in the dataset. The lambda statistic can then be entered into the equations used to test the study's hypotheses alongside the other independent variables, thereby statistically controlling for effects relating to each individual's estimated likelihood of dropping out of the study prematurely (Heckman 1976; 1979). This procedure is commonly known as the Heckman correction.

Measures

Accounting for Intra-Ethnic Diversity

Heterogeneity within pan-ethnic groups provides an obstacle for researchers interested in studying immigrants' social, educational, and economic outcomes. These studies necessitate more finely tuned ethnic definitions, focusing on immigrants' specific national origins rather than their broad, pan-ethnic classifications alone. To this end, the present study separates the children of Hispanic immigrant mothers into country-specific groups to the extent the data allow. Based on their mothers' country of birth and/or national origin group affiliation, Hispanic children are classified as Mexican, Puerto Rican, Cuban, or "other Hispanic" (a category composed of Hispanic children whose mothers were born in other countries or did not identify a national origin affiliation).

The ECLS-K's national origin data for U.S.-born Asian mothers and their children yield insufficiently large cell sizes for reliable application in inferential statistical models[15]. It is therefore necessary to group all Asian children under the same umbrella category in a study such as this, where within-group comparisons of children of foreign- and native-born mothers are a central focus.

This is far from an ideal situation. For example, Blair and Qiang (1998) convincingly demonstrate that Chinese, Filipino, Korean, Southeast Asian, and Japanese high schoolers differ significantly from one another, not just in terms of their educational performance, but also along such key family background characteristics as religion, language use, parental education, family size and income, and the availability of educational resources[16]. Thus, the present study's analysis of Asian children as a singular group is flawed, and is a regrettable consequence of data limitations[17].

Likewise, due to the absence of data indicating national origin group affiliation of native-born Hispanic mothers beyond the Mexican, Puerto Rican, and Cuban groups, it is not possible identify children of United States-born mothers from other prominent Hispanic national backgrounds (e.g., Dominicans, Salvadorans). Thus, while this study

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[15] As discussed above, prior to the Immigration and Naturalization act of 1965, immigration from Asian nations was strictly limited by a discriminatory quota system. Since 1965, Asian immigration rates have tripled (White and Glick 2009). Thus, a large proportion of Asians living in the United States in 1998 were either immigrants or the children of immigrants, and a much smaller proportion were members of the 3rd or higher generation. When this relatively small segment of the ECLS-K sample (<1%) is subdivided by country of origin, the resulting groups are too small to be used in the statistical models,

[16] See also Goyette and Xie (1999) for a discussion of Asian national origin differences in family behaviors.

[17] In their analysis of ECLS-K data, Glick and Hohmann-Marriott (2007) address this same problem by comparing country-specific groups of 1st/2nd generation Asian children to a pan-ethnic group of Asian 3rd-plus generation children. While this approach provides the benefit of permitting a descriptive comparison of children of immigrant mothers across Asian national origin groups, their foreign-born/native-born comparisons (which constitute the primary focus of the present study) remain flawed, as they rest on comparisons of country-specific groups to a heterogeneous, pan-ethnic Asian category.

makes headway toward examining ethnic differences at a finer level of specificity, it cannot be considered a comprehensive representation of all Hispanic or, especially, Asian immigrant groups in the United States.

The present study focuses on two key independent variables. The first indicates children's racial/ethnic identity and national origin group affiliation (Hispanics only; for other racial/ethnic groups national origin data are not available or the number of respondents in resulting racial/ethnic and national origin groups is too small for meaningful statistical analysis). The racial/ethnic and national origin groups examined are as follows:

- *Non-Hispanic white*: Children identified as white/Caucasian and non-Hispanic[18]. Children are not separately identified by country of origin.
- *Non-Hispanic black*: Children identified as black/African American[19] and non-Hispanic. Children are not separately identified by country of origin.
- *Mexican:* Children identified as Hispanic whose mothers either identified as Mexican (United States-born mothers) or reported being born in Mexico. *Mexican* children are identified by ethnicity and national origin-group affiliation but are not

[18] The use of the term "Hispanic" rather than "Latino/a" in the present study is not intended as a statement of preference for one term over the other; the debate over those terms' appropriateness continues, and I do not hold a position on either side, and note that both are acceptable according to the American Sociological Association's style guide.
[19] The ECLS-K questionnaire equates the terms "black" and "African American". However, not all individuals who identify as "black" (or who are regarded as such in American society) are African American; African immigrants, many West Indians, and many Hispanics from Caribbean countries may serve as examples of non-African American blacks. I therefore use the term "black" in the text due to its greater inclusiveness and accuracy. I do not capitalize "white" or "black" in accordance with the American Sociological Association's style guide.

differentiated by race (i.e., their mothers could select white, black, Asian, more than one race, or no response).

- *Puerto Rican*: Children identified as Hispanic whose mothers either identified as Puerto Rican (native-born mothers[20]) or reported being born in Puerto Rico. Like *Mexican* children, *Puerto Rican* children are identified by ethnicity and national origin-group affiliation but are not differentiated by race.
- *Cuban*: Children identified as Hispanic whose mothers either identified as Cuban (native-born mothers) or reported being born in Cuba. *Cuban* children are identified by ethnicity and national origin-group affiliation but are not differentiated by race.
- *Other Hispanic*: Children identified as Hispanic whose mothers either did not select a national origin group affiliation, selected the "South or Central American origin" catch-all response to the national origin question, or reported being born somewhere other than the United States, Mexico, Puerto Rico, or Cuba. *Other Hispanic* children are not differentiated by race.
- *Asian*: Children identified as Asian and non-Hispanic. Children are not separately identified by country of origin, as too few children of native-born mothers are represented in the available national origin categories to permit statistical

[20] Mothers born in Puerto Rico are technically not "foreign-born", as Puerto Rico is a United States territory. However, like many other studies of migration to the United States (e.g. Alba and Nee 2003, Landale and Oropesa 2001), the present study distinguishes between mainland-born Puerto Ricans and those who have migrated to one of the 50 states. For stylistic consistency, the text refers to these mothers as native- and foreign-born, respectively. Given the linguistic and cultural distinctiveness of Puerto Rico, the present study makes the implicit contention that the native-born/foreign-born characterization is as salient for Puerto Ricans as it is for Latin American groups from politically independent nations.

comparisons between children of foreign- and native-born mothers within national origin groups.

The second variable indicates mother's nativity [foreign- or native (U.S.)-born]. This information, along with data on race/ethnicity and national origin was provided by the child's primary caregiver (in most cases the mother).

Chapter 3

Chapter 3 examines school readiness variation across race/ethnicity, national origin, and generational status groups. Analyses in Chapter 3 focus on four outcomes, each of which represents a distinct dimension of school readiness: literacy readiness, numeracy readiness, general knowledge readiness, and behavioral readiness. These measures are described below.

- *Literacy Readiness*: This dimension of school readiness is based on a child's score on the ECLS-K's item response theory (IRT) reading test in the fall of 1998. The complete reading test comprises ten proficiency levels: letter knowledge, knowledge of beginning sounds, knowledge of ending sounds, "sight" word recognition, identifying words in context, drawing literal inferences, extrapolation, reading evaluation, nonfiction comprehension, and complex syntax evaluation. Kindergartners were administered a reduced test that included items belonging to the first five proficiency categories only, as the higher-order domains of reading proficiency exceed the abilities of even the highest-achieving new kindergartners. The test's broad array of evaluated competencies as well as its grounding in item response theory allows the same instrument to be administered to children with rudimentary reading ability as well as those with highly developed reading skills. The breadth of material covered by the ECLS-K's IRT tests becomes particularly useful in Chapter 4, in which the focus is on children's test score growth over the kindergarten through eighth grade period.

- *Numeracy Readiness:* This dimension of school readiness is based on a child's score on the ECLS-K's IRT mathematics test in the fall of 1998. The proficiency levels measured by the mathematics test include number and shape identification, relative size comparison, ordinality and sequence recognition, addition and subtraction, multiplication and division, place value understanding, measurement and rate knowledge, fractions, and area and volume knowledge. Kindergartners' proficiencies were tested up to multiplication and division ability.
- *General Knowledge Readiness:* This dimension of school readiness is indicated by a child's score on the ECLS-K's IRT general knowledge test in the fall of 1998. This test was designed to assess children's knowledge of the physical, natural, and social world, as well as their ability to draw inferences, comprehend implications, and establish relationships.

The kindergarten general knowledge test is divided into two content areas: science and social studies. Science questions evaluate children along three dimensions: earth and space science (e.g., soil, rain, the sun and moon), physical science (e.g., matter and motion), and life science (e.g., ecology and human health). Social studies questions include questions in five categories: history (e.g., present vs. past), government (e.g., purposes of government, distinctions between local, state, and national government), culture [e.g., everyday objects ("what do trains and planes have in common?"), and social roles ("what does a fireman do?")], geography (e.g., knowledge of where one lives in relation to the rest of the world, familiarity with maps), and economics (e.g., distinguishing between needs and wants, understanding the division of labor, understanding the relationship between supply and demand). The bulk of the test questions are devoted to the culture and geography areas (NCES 2002).

- *Behavioral Readiness:* Behavioral readiness was measured by teacher ratings of children's task-related classroom behavior in the fall of 1998. Teachers were asked to rate children's behaviors that affect the ease with which the child could benefit from the classroom learning environment from one (never) to four (very often) in the following areas: attentiveness, task persistence, eagerness to learn, learning independence, flexibility, and organization (NCES 2002).

The goal of Chapter 3 is to describe patterns of school *unreadiness* along the dimensions described above. For the purposes of this analysis, unreadiness is operationalized by a dichotomous variable indicating whether a child falls within the lowest quintile of students in the ECLS-K sample on each measure. This operationalization follows previous work on school readiness using the ECLS-K (Farkas and Hibel 2007).

To provide an illustrative example of the difference between 'unready' and 'ready' students, Table 2.2 presents average reading proficiency probabilities across the four most basic domains of reading: letter recognition, knowledge of beginning sounds, knowledge of ending sounds, and knowledge of sight words. These proficiency probabilities, which are based on children's scores on the IRT-modeled reading ability test, are interpreted as a given child's likelihood of being proficient in a given domain of reading ability. Table 2.2 displays sample means, with respondents separated based on their scores on the reading unreadiness variable.

[TABLE 2.2 HERE]

These proficiency probabilities highlight exactly how disadvantaged "unready" children are with respect to the remaining 80 percent of new kindergarteners. Students in the 'unready' category in literacy have a 0.12 probability of being proficient in naming the letters of the alphabet, and virtually no likelihood of proficiency in the higher-order reading and pre-reading skills. By comparison, children who are not coded 'unready' have a 0.88 probability of being proficient in knowing their letters, a 0.41 probability of being proficient in identifying beginning word sounds, and a 0.23 probability of being proficient in identifying ending sounds. Put in simplified terms, children who are unready for school in terms of their pre-reading skills arrive for the first day of kindergarten needing assistance to learn their ABCs, while the remaining 80 percent of children arrive on the first day of school already well on their way to sounding out words. 'Unready' children are grappling with the fundamental mechanics of learning at the time of school entry, while 'ready' children are far closer to using written language as a tool to acquire new skills and knowledge. Given the powerful influence of early academic skills on later achievement (Duncan et. al 2007, Entwisle and Alexander 1990), children classified as 'unready' in the present study are forced to cope with a considerable setback at the outset of their academic careers.

Literacy and General Knowledge unreadiness were more complicated to determine than unreadiness in other dimensions. Students from non-English backgrounds were administered the Oral Language Development Scale (OLDS) by ECLS-K personnel, and only those students who passed the test were administered the IRT reading and general knowledge batteries. Thus, children without basic English competency levels at school entry – a group composed largely of the children of minority immigrant parents – did not receive reading ability or general knowledge scores in the fall of 1998. The fact that a student was screened out of the reading or general knowledge assessments based on his or her primary language, in and of itself, does not indicate that the child possessed any cognitive deficiency that would limit his or her ability to comprehend and manipulate written language or grasp the intricacies of the physical and natural world. However, since the outcome of interest in Chapter 3 is *unreadiness to begin formal schooling in the United States*, children who demonstrated inadequate command of the English language to receive the reading or general knowledge batteries were coded as 'unready' along those dimensions. *Unreadiness*, therefore, takes on a meaning above and beyond a strictly cognitive definition in the present study. This concept of unreadiness includes the inability to meet the linguistic profile expected of U.S. kindergarten students as well as the inability to demonstrate the expected degree of cognitive and behavioral preparedness. Children who did not pass the OLDS were administered a translated version of the mathematics assessment, and therefore received scores that were considered alongside those of English-proficient students in constructing the mathematics unreadiness variable. All children's teachers assessed their behavioral readiness as well.

In addition to children's race/ethnicity, national origin, generational status, and gender[21] information, the regression models presented in Chapter 3 include 13 covariates reflecting two general categories of influence. The first area of influence is family socioeconomic background, indicated by the following measures:

- *Family Socioeconomic Status (SES):* Family SES is indicated by the child's score on a scale created by NCES, reflecting their household income, parents' educational attainment, and parents' occupational prestige. I standardized this scale score across all children in the fall kindergarten wave of data, such that a child with a sample-mean level of family SES received a score of zero, and the sample distribution of the variable had a standard deviation of one.
- *Family income*: Family income was reported by the child's primary caregiver, and reflects the total household income in the year prior to kindergarten entry
- *Poverty*: Poverty is indicated by a dichotomous variable indicating whether or not a child's family income in 1998 placed the family below the federal poverty line (1= below the poverty line, 0 = above the poverty line)

[21] Gender is indicated by a dichotomous variable labeled "male" (1=male, 0=female).

- *Central City Residence*: This dichotomous variable indicates whether the child lived in a metropolitan area defined as a 'central city' by NCES in 1998 (1= lived in a central city, 0= lived in a non-central city community setting).
- *Mother's college attendance*: This dichotomous variable indicates whether the child's mother had an educational attainment of at least "some college" in 1998 (1=some college or higher attainment, 0= high school graduate or lower attainment)
- *Father's college attendance*: This dichotomous variable indicates whether the child's father had an educational attainment of at least "some college" in 1998 (1=some college or higher attainment, 0= high school graduate or lower attainment)
- The second category of independent variable is pre-K learning resources, indicated by the following measures: *Head Start Attendance*: This dichotomous variable indicates whether the child participated in the federally funded Head Start program prior to kindergarten entry, as reported by the child's parent and corroborated by NCES personnel (1=attended Head Start, 0= did not attend Head Start)
- *Number of Books in the Home*: This measure is a direct count of the number of books available to the child in his or her home in fall, 1998, and is a proxy measure for the learning environment in the home.
- *Computer in the Home*: This dichotomous measure indicates whether or not the child has access to a home computer in 1998 (1=computer present, 0=no computer present).
- *Arts and Crafts Participation*: This dichotomous measure indicates whether or not the child's primary caregiver reported that the child participated in organized arts

and crafts activities outside the home in the year prior to kindergarten entry (1=yes, 0=no)

- *Performing Arts Participation*: This dichotomous measure indicates whether or not the child's primary caregiver reported that the child participated in organized performing arts activities outside the home in the year prior to kindergarten entry (1=yes, 0=no)
- *Sports/Clubs Participation*: This measure indicates the number of sports teams and/or clubs in which the child participated in the year prior to kindergarten entry, as reported by his or her primary caregiver.
- *Educational Trips*: This measure indicates the number of educational trips that the child's primary caregiver(s) reported taking the child on in the year prior to kindergarten entry.

Chapter 4

Analyses in Chapter 4 examine the same reading and math IRT test scores used in Chapter 3, although the Chapter 4 analyses investigate changes in these scores from kindergarten entry through the end of eighth grade. Children were administered the reading and math instruments at each wave of data collection. Thus, each individual contributes as many as six scores that can be used to model ability growth[22].

[22] Partial missingness on the dependent variable is not especially problematic for the mixed effects model and does not require listwise deletion. The maximum likelihood estimator produces unbiased model parameter estimates once predictors relating to the missingness are in the model (Singer and Willett 2003).

Like Chapter 3, Chapter 4 is primarily concerned with variation in the outcomes associated with children's racial/ethnic identity, national origin group affiliation, and mother's nativity. Additional independent variables include child gender, family socioeconomic status (SES), school racial/ethnic minority and subsidized meal-eligible enrollments, and community minority immigrant composition. School social context is measured in terms of racial/ethnic and socioeconomic composition. Elementary school principals[23] were asked to report a percentage breakdown of students in their schools according to race/ethnicity. I used this information to create a variable indicating each school's proportionate non-white enrollment.

Principals also reported the proportion of students qualifying for free and reduced-price school lunches through the U.S. Food and Nutrition Service's National School Lunch Program[24]. This program, which was established in 1946 under the National School Lunch Act, provides free lunches to children whose families receive public assistance in the form of Food Stamps or TANF, those who qualified for Head Start or Even Start based on those programs' income criteria, homeless, migrant, or runaway children receiving social services assistance, and children whose household income is at or below 130 percent of the Federal poverty threshold. Reduced-price lunches, which cost 40 cents or less, are provided to students whose household income falls between 130 and 185 percent of the Federal poverty threshold. I combined schools'

[23] School context measures are taken from the fifth grade wave of data collection and are treated as time-invariant in the statistical models. The elementary school context is used as opposed to middle school context because students spent their earliest (and arguably most formative) years in these schools and attended them for at least twice as long as their middle schools.
[24] Information about the National School Lunch Program is taken from United States Department of Agriculture (2008).

free and reduced-price lunch-eligible enrollments to create a single indicator of the proportion of a school's students who face acute socioeconomic disadvantage.

Community minority immigrant context is indicated by an additive index composed of two variables taken from the 2000 Census – the year that most students were in first and second grade. The first variable reports the percentage of residents living in the same zip code as the school a child attended who were born outside the U.S. The second census variable indicates the proportion of households in a child's zip code that were "linguistically isolated" in 2000. Linguistic isolation occurs when all members of a household aged 14 and over speak a language other than English, and none speaks English "very well" (the other response options are "well", "not well", "not at all") (Siegel, Martin, and Bruno 2001). Since both measures were highly positively skewed, I log-transformed the scores to more closely approximate normality.

Model fit analyses (not presented) indicated that an additive combination of the two measures provided preferable model fit to alternative model specifications in which each measure was included separately. With the log-transformed measures of community immigrant and linguistically isolated representation additively combined, I standardized the resulting values across all children in the fall kindergarten sample. Thus, a score of zero on the variable, which I refer to in tables and text as "community immigrant concentration", indicates a sample-mean minority immigrant context, negative values reflect lower levels of minority immigrant representation, and higher scores reflect a higher degree of minority immigrant clustering.

Chapter 5 Measures

Chapter 5 analyzes a subset of the ECLS-K sample composed of students who contributed data in the final wave of data collection (the spring of eighth grade) and for whom there was no item missingness across the variables examined in the final statistical model (N = 5,045).

Unlike the preceding chapters, Chapter 5 examines children's schooling-related self-perceptions as opposed to their test performance or teacher evaluations. ECLS-K respondents completed the verbal/reading and mathematical self-concept portions of the Self-Description Questionnaire II (Marsh 1992) in the spring of eighth grade. These scales included items on respondents' performance in English and mathematics classes, as well as their interest in and enjoyment of reading and mathematics. Each scale score represents the respondent's mean rating of the items in the scale, with possible ratings of "1 – not at all true", "2 – a little bit true", "3 – mostly true", and "4 – very true". As with most questionnaire measures of social-emotional characteristics, the verbal/reading and mathematics self-concept distributions are positively skewed. Internal reliability, as measured by Cronbach's alpha, is acceptable for both scales [$\alpha_{\text{verbal competence}}$ = 0.76, $\alpha_{\text{math competence}}$ = 0.89 (Tourangeau et. al 2009)].

Chapter 5's key independent variables largely mirror those included in the prior analyses. Given the present study's aims, the most important predictors of competence are children's race/ethnicity, national origin group affiliation, and mothers' nativity. In addition, the models include information about children's family SES, gender, and reading and mathematics ability, as well as their school racial and socioeconomic composition and community immigrant context. Family SES, gender, school context, and community context variables appear in the same form in Chapters 4 and 5 (described above).

Family socioeconomic status is a candidate to influence adolescents' academic self-concepts, and to mediate the influence of race/ethnicity and generational status as well. Prior research indicates that the association between family SES and self-concept generally ranges from zero to a modest positive relationship (Marsh and Parker 1984). Children construct their academic self-concepts with respect to external frames of reference, encountered through interactions with family members, peers, and teachers (Marsh 1986, Skaalvik and Rankin 1995). To the extent that an individual's social comparisons and the evaluations offered by significant others are colored by his or her socioeconomic background, SES can be expected to be positively associated with measures of academic self-concept.

Gender is also expected to demonstrate an association with academic self-concept. Hattie's (1992) meta-analysis of research on gender differences in self-concept indicates that gender is significantly associated with domain-specific academic self-concept. The study found a consistent pattern of higher levels of perceived mathematics competence among boys and higher levels of perceived verbal competence among girls. I hypothesize that the same relationships will hold in the present study.

Academic ability is included in the multilevel models as a potential mediator of the relationship between the demographic variables of interest and academic self-concept. A portion of academic self-concept may be attributable to academic ability[25]. In order for the analysis of associations among race/ethnicity, national origin, generational status and academic self-concept to be conceptually distinct from the previously reported analyses of academic ability, ability must be disentangled from the self-concept construct.

Theory suggests that academic performance and academic self-concept are reciprocally related, with an individual's performance at one time point shaping his or her academic self-concept at a later time, which in turn influences subsequent performance, and so on (Skaalvik and Hagtvet 1990). Fall-of-kindergarten academic ability, as opposed to a measure drawn from one of the later waves of data collection, is used as the indicator of academic ability because it is the most exogenous with respect to the reciprocal process of achievement, evaluation, and self-concept formation that occurs as children progress through school. Having received little feedback on their academic performance upon which to base their academic self-concepts, new kindergarteners' reading and mathematics ability test scores should be less strongly influenced by the same underlying construct tapped by their self-concept scores in eighth grade than ability measures obtained after children have accrued more schooling experience. Thus, a unidirectional effect from kindergarten academic ability test score to eighth grade academic self-concept can be inferred with more confidence than, for

[25] A meta-analysis of 128 studies examining the link between self-perceptions and academic achievement (Hansford and Hattie 1982) found an average correlation of 0.21 between academic self-concept and academic achievement.

example a unidirectional effect of fifth grade ability test score on eighth grade self-concept[26].

Methods

Chapter 3 Methods

Chapter 3 consists of two analyses. The first analysis is strictly descriptive, and is intended to document patterns of school readiness variation across racial/ethnic, national origin, and generational status groups. The key comparisons in this section are between the children and foreign- and native-born mothers within racial/ethnic and national origin categories. The analysis involves the calculation of the proportion of each segment of the population that is 'unready' for school along each previously described readiness dimension, and tests the statistical significance of foreign-born/native-born mother differences within each group.

The second phase of the Chapter 3 data analysis employs a random-effects logistic regression framework to estimate children's odds of being unready to learn at kindergarten entry. This multilevel regression approach adjusts standard error estimates to reflect the clustering of students within common geographical locations.

The random-effects logit model makes comparisons within clusters (in this case, schools) as opposed to calculating population-average estimates. This difference can be subtle. For example, the random-effects logit model can answer the question, "Is a child

[26] Endogeneity bias in this case is further mitigated by evidence suggesting that academic self-concept has not yet been crystallized into a stable trait when children are kindergarten-aged (Marsh 1993). Self-concept (as measured in eighth grade) cannot cause kindergarten academic ability score because it has not yet been developed among kindergarteners.

with lower-than-average family SES more likely to experience literacy unreadiness than a child with average family SES *who attends the same school*?", while logit models that do not account for clustering answer the question, "Is the *population-average* child with lower-than-average family SES more likely to experience literacy unreadiness than the *population average* child with average family SES?" A random-effects model can be extended to estimate school-specific effects and the variation across schools in the magnitude of these effects. However, no level-2 contextual effects are explicitly modeled in Chapter 3.

The random-effects logit modeled can be specified as

$$\log it[P(Y_{ij}=1\,|\,\pi_{0i}, X_{ij}=x_{ij})]=\log\left(\frac{P(Y_{ij}=1\,|\,\pi_{0i}, X_{ij}=x_{ij})}{P(Y_{ij}=0\,|\,\pi_{0i}, X_{ij}=x_{ij})}\right)=\pi_{0j}^{RE}+\pi_{1j}^{RE}x_{ij}$$

where the predicted value of the outcome is transformed via the logit link to take on the value of the log-odds of "success" (in this case, unreadiness). When the probability of success is greater than 0.5, the odds are greater than 1.0 and the log-odds value is positive. When the probability of success is less than 0.5, the odds are less than 1.0 and the log-odds value is negative. The *RE* superscripts on the intercept and slope coefficients on the right side of the equation represent the school-level random effects associated with those model parameters. The random-effects logit models presented in Chapter 3 were estimated using Stata 10's *xtlogit* command.

Chapter 4 Methods

The mixed-effects or multilevel model for change permits the researcher to simultaneously examine within- and between-person longitudinal change processes. In Chapter 4, the mixed-effects model estimates each child's reading and math ability growth from kindergarten entry through the spring of the eighth grade year while also identifying and "explaining" systematic variation in children's ability trajectories.

Various authors have presented their own unique expressions of the mixed-effects model. Raudenbush and Bryk (2002) and Singer and Willett (2003) provide two of the most widely cited perspectives on mixed-effects modeling. These authors consider a single mixed-effects model to actually represent a collection of separate, hierarchically nested models. The model consists of a level-1 submodel, which estimates each individual's initial status and rate of change, and a level-2 submodel, which models between-person variation in growth trajectories. The models in Chapter 4 add a third level of analysis to the mixed-effects model, capturing community/school-level effects (i.e., the association between interindividual differences in test score growth and community and school demographic characteristics).

They key attraction of the mixed-effects model lies in its powerful variance partitioning capabilities. In addition to fixed-effects parameters, which provide estimates of the statistical relationships between independent variables and changes in individual growth trajectories, the random effects, or stochastic portions of the model permit the researcher to identify and examine the sources of population heterogeneity (i.e., within-individual, between-individual, and between-group) while estimating the degree to which this heterogeneity can be accounted for by a given set of predictors.

The basic level-1 submodel can be expressed as

$$Y_{ijk} = \pi_{0j} + \pi_{1i}(\mathrm{TIME}_{ij}) + \varepsilon_{ij}$$

where Y_{ijk} represents the outcome of interest (in this case, ability score) for child *i,* in school *k,* at time *j* expressed as a linear function of the child-specific time of assessment. Deviations from this linear trajectory are captured by the random error term, $\varepsilon_{ij.}$ However, as demonstrated in the Appendix, a better approximation of test score growth is provided by a nonlinear, quadratic function. Thus, the basic level-1 submodel is expanded through the inclusion of a second, squared time variable, TIME^2, yielding

$$Y_{ijk} = \pi_{0j} + \pi_{1i}(\mathrm{TIME}_{ij}) + \pi_{2i}(\mathrm{TIME}^2{}_{ij}) + \varepsilon_{ij}$$

The level-2 submodel captures population processes that produce interindividual variation in growth trajectories. As such, the outcomes of the level-2 submodel equations are themselves parameters of the level-1 submodel. Thus, the level-2 submodel models the extent to which the level-1 parameters vary as a function of time-invariant, person-specific characteristics (i.e., fixed effects) and their associated random effects. The level-2 submodel can be expressed as

$$\pi_{0j} = \beta_{00} + \beta_{01} X_i + r_{0\mathrm{i}}$$

$$\pi_{1i} = \beta_{10} + \beta_{11} X_i + r_{1\mathrm{i}}$$

$$\pi_{2i} = \beta_{20} + \beta_{21} X_i + r_{2\mathrm{i}}$$

In this example of the level-2 submodel, each child's intercept, $\pi_{0j,}$ as well as both growth parameters, π_{1i} and π_{2i}, are expressed as functions of a population-average intercept plus a slope parameter (β_{01}, β_{11}, and β_{21}) associated with a child-level covariate. Each equation also contains a person-specific residual, r_i, which captures individual variation around the population average for each estimated level-1 parameter. The population variances of these residuals reflect the unexplained heterogeneity in level-1 intercepts and slopes, conditional on the presence of the level-2 predictor(s).

Just as the outcomes of the level-2 submodel equations are level-1 submodel parameters, the outcomes of the level-3 submodel equations are components of the level-2 submodel. A simple expression of the level-3 submodel includes direct effects of community predictors, though it is fairly straightforward to estimate cross-level interactions (i.e., terms that allow the effects of level-3 covariates to vary according to values of level-2 covariates). This 'main effects-only' specification of the level-3 submodel yields

$$\beta_{00} = \gamma_{000} + \gamma_{001} S_k + u_{00k}$$

$$\beta_{10} = \gamma_{100} + \gamma_{101} S_k + u_{10k}$$

$$\beta_{20} = \gamma_{200} + \gamma_{201} S_k + u_{20k}$$

where the constant term in each level-2 equation is a function of an intercept and a slope parameter associated with a school/community-level covariate as well as a school/community-specific residual, u_k. Just as the variances of the level-2 residuals captured population heterogeneity between individuals, the level-3 conditional residual variances reflect unexplained between-community heterogeneity in individual growth trajectories.

While it is helpful to present the mixed-effects model as a series of separate submodels, each of which comprises multiple equations, these separate equations are estimated simultaneously in the actual mixed-effects model. Most popular statistical software packages such as SAS and Stata are capable of estimating these models. In addition, purpose-built multilevel modeling software such as HLM exists. Stata is arguably more flexible and computationally transparent than HLM, but it is also a more memory-expensive program, and thus runs the maximum likelihood estimator much less efficiently on all but the most up-to-date, powerful computers. Due to this limitation, the mixed-effects models presented in this chapter are estimated using HLM 6.0, which, while a bit less friendly to its users, runs more efficiently than Stata.

When applied to large samples such as the ECLS-K, maximum likelihood estimates are asymptotically unbiased, asymptotically normally distributed, and asymptotically efficient (Singer and Willett 2003). These characteristics mean that, through its iterative process of maximizing the log-likelihood function for all model parameters, the maximum likelihood estimator converges on the unknown population parameters' true values and yields efficient (i.e., small, relative to other estimators) standard error estimates.

Two variants of maximum likelihood estimators exist: full and restricted maximum likelihood. While the evidence generally suggests that, with large samples, the two methods do not provide appreciably different parameter or standard error estimates (Kreft and de Leeuw 1998), one area in which the methods do differ is in the availability and interpretation of goodness-of-fit tests. Fit statistics for restricted maximum likelihood models can only be used to compare the stochastic portions of two models. Further, the restricted maximum likelihood models being compared must have identical fixed-effects specifications. However, any two models estimated using maximum likelihood estimation may be compared, and the goodness of fit statistics provide a comparison of overall model fit, not just differences in the random effects portion of the model. With these advantages in mind, the models presented here are estimated using the full maximum likelihood estimator.

Chapter 5

The analyses of verbal/reading and mathematics self-concept presented in Chapter 5 are based on two-level random-effects models. These multilevel models are similar to those presented in Chapter 3, although they predict outcomes along a continuous scale using an identity link function (i.e., a non-transformed outcome). The Chapter 5 models also differ from those presented in Chapter 3 due to their explicit modeling of school/community-level contextual effects.

Expressed as concurrent submodels in the same manner as the mixed-effects model above, the level-1 random-effects submodel is:

$$Y_{ij} = \pi_{0j} + \pi_{1j} X_{1ij}, \ldots, \pi_{ni} X_{nij} + \varepsilon_{ij}$$

where Y_{ij} represents the outcome (predicted academic self-concept) for child i in school j, π_{0j} represents the school-specific intercept (i.e., conditional school-mean competence score), $X_{1ij}, \ldots, X_{nij}$ represents the vector of level-1 (child/family-level) covariates, and ε_{ij} represents the random effect associated with child i in school j (i.e., the between-child, within-school effect, the variance of which represents unexplained residual variance between children after taking $X_{1ij}, \ldots, X_{nij}$ into account).

The level-2 submodel describes between-school/community differences in children's perceived academic competence. The outcomes of the level-2 submodel are the level-1 model parameters, so that each child's predicted self-perceived competence score is modeled as a child-specific deviation from a school/community-specific intercept and vector of slope parameters. The level-2 submodel can be expressed as

$$\pi_{0j} = \beta_{00} + \beta_{01} S_j + r_{0j}$$

$$\pi_{1j} = \beta_{10} + \beta_{11} S_j + r_{1j}$$

$$\pi_{nj} = \beta_{n0} + \beta_{n1} S_j + r_{nj}$$

where β_{00} represents the adjusted mean competence in schools/communities with scores of zero on covariate S_j, β_{01} represents the effect of covariate S_j on school-mean competence, r_{0j} represents the between-school residual in mean self-perceived competence, $\beta_{10}, \ldots, \beta_{n0}$ represent the pooled within-school/community regression coefficients for level-1 covariates $X_{1ij}, \ldots, X_{nij}$, $\beta_{11}, \ldots, \beta_{n1}$ represent level-2 covariate effects on level-1 regression coefficients[27], and $r_{1j}, \ldots, r_{nj}$ represent between-school random effects on the respective level-1 slope coefficients.

[27] This statistical relationship is probably most easily understood as a form of moderation. The coefficients $\beta_{11}, \ldots, \beta_{n1}$ are often termed "cross-level interactions", as they represent moderation of child-level effects by school-level variables.

These two-level random-effects models are easily and efficiently estimated in Stata 10 via the *xtreg* command and the *mle* estimator specification, which invokes the maximum-likelihood estimator[28].

A Note on ECLS-K Sampling Weights

The ECLS-K data files include several different specifications of probability weights with each wave of data. These weights were designed by NCES specifically to compensate for children's differential selection probabilities and to adjust for the effects of nonresponse (Tourangeau et. al 2009). Including the appropriate weights is necessary for analyses to reflect the population proportions represented in the original sampling design. By including these weights in the analyses reported in the present study, I ensure that longitudinal analyses and analyses of data obtained in later waves of collection, when sample sizes had been reduced, can have the same field of generalizability as analyses of the ECLS-K's original nationally representative sample. In Chapter 3, I used the ECLS-K's base year child weight, which adjusts for within-school selection probability and non-response (Tourangeau et al. 2009). In Chapters 4 and 5 I used the eighth grade longitudinal child weight, which adjusts for selection probability, non-response, and sample attrition.

[28] The generalized least squares (GLS) estimator is Stata's default. However, for the reasons discussed above, the maximum likelihood estimator is preferable.

Tables

Table 2.1

Number of Respondents in the ECLS-K Sample by Data Collection Round

Fall-K	19,684
Spring-K	20,578
Spring-1st	17,324
Spring-3rd	15,305
Spring-5th	11,820
Spring-8th	9,725

Source: Tourangeau et. al (2009)

Table 2.2: Reading Proficiency Probabilities by 'Unreadiness' Status

	Lowest Quintile (Unready)	Remaining 80% of Students	Overall Mean Proficiency Probability
Letter Recognition	0.12	0.88	0.73
Beginning Sounds	0.01	0.41	0.33
Ending Sounds	0.003	0.23	0.19
Sight Words	0.00	0.04	0.03

CHAPTER 3

Generational Status Differentials in Children's School Readiness:

Examining the Roles of Race/Ethnicity and Country of Origin

Introduction

School readiness, and inequality therein, has garnered increasing attention among researchers and policy makers interested in understanding and, ultimately, mitigating educational inequality. The topic of school readiness has generated recent edited volumes (e.g., Booth and Crouter 2008, Pianta, Cox, and Snow 2007), policy reports (e.g., Burkham and Lee 2002), and dedicated special issues of research journals (e.g., *The Future of Children*, vol. 15, no. 1, 2005). Much of this research has followed in the tradition of American sociology of education, focusing on white/minority and high/low-SES comparisons. The present chapter contributes to the body of research of school readiness inequality by examining the roles played by generational status and immigrant country of origin in addition to race/ethnicity and socioeconomic status.

The present chapter focuses on the following research questions:

(1) How do children of racial/ethnic minority immigrant mothers compare to the children of native-born mothers in terms of their readiness to succeed in school?

(2) Which minority immigrant groups tend to arrive in the United States well-prepared to achieve educational success, and which groups face the steepest disadvantages?

(3) What factors explain school readiness differences between co-ethnic children of foreign- and native-born mothers?

Descriptive Analysis

Table 3.1 presents sample means or proportions for all control variables used in analysis for fourteen different racial/ethnic and generational status groups: non-Hispanic white children of foreign-born and native-born mothers, non-Hispanic black children of foreign-born and native-born mothers, Mexican children of foreign-born and native-born mothers, Puerto Rican children of foreign-born and native-born mothers, Cuban children of foreign-born and native-born mothers, other Hispanic children of foreign-born and native-born mothers, and Asian children of foreign-born and native-born mothers.

[TABLE 3.1 HERE]

A cursory comparison of the group means reported in Table 3.1 yields descriptive information about the influence of race/ethnicity and generational status on the life circumstances of children and their families. These descriptive statistics illustrate the similarities and differences between each group with respect to important background characteristics that predict school unreadiness.

Among non-Hispanic white children, those born to native-born mothers have greater access to resources than children of immigrant mothers. These advantages include higher average SES scores and higher family incomes. In addition, a lower proportion of this group is living in poverty and a greater proportion has a college-educated mother or father. Finally, non-Hispanic white children with native-born mothers have more books in the home, greater access to a home computer, and higher levels of participation in sports and activities. Readers should keep in mind, though, that the differences between children with native- and foreign-born mothers are not always very large (e.g., Head Start attendance).

The disparity between foreign-born and native born non-Hispanic white children is reversed among non-Hispanic black children and their families along several important measures of family context. Descriptive statistics suggest that black children of foreign-born mothers have higher average family SES and higher median family incomes. In addition, a smaller proportion of black children of foreign-born mothers live in poverty, and a higher proportion have fathers who attended college. However, a smaller proportion of black children of native-born mothers reside in central cities, and a higher proportion report performing arts activity participation. Along the remaining dimensions of family background, black children of foreign- and native-born mothers differ only marginally or not at all (e.g., number of books in the home, mothers' college attendance).

Foreign-born/native-born mother differences among the Hispanic groups more closely resemble the pattern for non-Hispanic white families than black families. Among Mexican, Puerto Rican, and other Hispanic children, those with foreign-born mothers have lower family SES, lower median family income, and a higher proportion of families living in poverty than children of native-born mothers. Cubans vary somewhat from this pattern; children of foreign-born mothers live in lower-SES and lower income families, on average, than children of native-born mothers, but the proportion of children living in poverty is equal between generational status categories. This suggests that there may be more economic differentiation within the Cuban-American community than exists in other immigrant groups, which is consistent with findings from prior research (Portes and Zhou 1993; Wilson and Portes 1980). While third-plus generation Cubans are, on average, quite prosperous (their median family income is the highest of any group, along with third-plus generation Asians), 13 percent of children in this category still live in poverty.

Within each Hispanic group, the proportion of children living in a central city is higher among those with foreign-born mothers. A smaller proportion of Hispanic children of foreign-born mothers have parents who attended college than their third-plus generation counterparts as well. In general, Hispanic children of foreign-born mothers also possess fewer educational resources and lower levels of activity participation than children of native-born mothers, though this is not always the case (e.g., performing arts, sports/clubs, and educational trips participation among Puerto Ricans).

Within the Asian category, children of foreign-born mothers demonstrate lower average family SES, lower median family income, and a higher proportion of families in poverty. In addition, Asian children of foreign-born mothers more frequently live in a central city, have access to fewer books in the home, and a smaller proportion of their mothers and fathers attend college. It is interesting to note, however, that despite facing multiple socioeconomic disadvantages, Asian children in families with foreign-born mothers have only slightly lower levels of home computer access and activity participation than Asian children of native-born mothers. This finding is in line with prior research on Asian immigrant families indicating a strong parental commitment to and involvement in children's educational development (e.g., Zhou and Bankston 1994). In the next section, I focus attention on school readiness differences between and within racial/ethnic and national origin groups. With these initial learning gaps identified, the focus will turn to examining the extent to which between- and within-group school readiness inequalities can be explained by the family background characteristics discussed above.

Examining School Readiness Differentials

Figures 3.1 through 3.4 present the proportion of children in each racial/ethnic and national origin group classified as 'unready' along each dimension of unreadiness: literacy, numeracy, general knowledge, and approaches to learning. *T*-tests of mean unreadiness differences between children of foreign- and native-born mothers within each group were conducted; asterisks following group names indicate statistically significant differences[29].

[FIGURES 3.1 – 3.4 HERE]

In terms of literacy readiness (Figure 3.1), Mexican, Puerto Rican, and other Hispanic children of foreign-born mothers are at a particular disadvantage, with two thirds of Mexican, over half of Puerto Rican, and 39 percent of other Hispanic children of foreign-born mothers falling in the bottom quintile of ECLS-K students in reading test scores. The foreign-born/native-born mother gaps in literacy unreadiness are quite large for Mexican, Puerto Rican, and other Hispanic children, as the unreadiness proportion drops to approximately 29 percent among Mexican and Puerto Rican children of native-born mothers and 21 percent among other Hispanic children of native-born mothers. Non-Hispanic white children also demonstrate a significant advantage among the children of native-born mothers, although the actual gap between non-Hispanic white children with foreign-born and native born mothers is substantively quite small.

Non-Hispanic black children do not demonstrate literacy unreadiness differences between the children of foreign- and native-born mothers. Nonetheless, a smaller proportion of black versus Hispanic children of foreign-born mothers exhibit literacy unreadiness, while a slightly greater proportion exhibit literacy unreadiness compared to non-Hispanic white and Asian children of foreign-born mothers.

[29] Two-tailed tests. *p<.05, **p<.01, ***p<.001

While non-Hispanic white, Mexican, Puerto Rican, and other Hispanic children demonstrate more unreadiness among the children of foreign-born mothers, Asian children demonstrate significantly less unreadiness among the children of foreign-born parents relative those with native-born mothers. This finding is somewhat counterintuitive because Asians, like non-Hispanic white and Hispanic children, demonstrate family background disadvantages among the children of foreign-born mothers. However, this material disadvantage does not result in higher levels of literacy unreadiness among Asian children of foreign-born mothers.

Asian children of foreign-born mothers not only have lower levels of unreadiness than those with native-born mothers, they demonstrate the lowest level of literacy unreadiness of any group in the study. It would be inaccurate to portray Asian children of foreign-born mothers as disadvantaged relative to the entire population of kindergarten-aged children. In terms of their family SES and parental college attendance, Asian children of foreign-born mothers appear to be the most advantaged first/second generation group, and enjoy more favorable circumstances than black, Mexican, Puerto Rican, or other Hispanic children of native-born parents as well. Still, first/second generation Asian children do face obstacles such as a relatively high proportion of children living in poverty and relatively few books in the home, in addition to unmeasured challenges associated with immigration. Yet these children have lower levels of literacy unreadiness than the most advantaged group in study (in terms of the indicators reported in Table 3.1): Asian children of native-born mothers.

The patterns of unreadiness evident in the literacy dimension (Figure 3.1) are replicated in the numeracy dimension (Figure 3.2). As with literacy unreadiness, non-Hispanic white, Cuban, and Asian children demonstrate the lowest levels of numeracy unreadiness, while a higher proportion of black, Mexican, Puerto Rican, and other Hispanic children are unready. Statistically significant disadvantages are evident among children of foreign-born mothers in the non-Hispanic white, Mexican, Puerto Rican, and other Hispanic categories, though these gaps tend to be smaller for numeracy unreadiness than literacy unreadiness as a result of less prevalent numeracy unreadiness than literacy unreadiness among the children of foreign-born mothers. As with literacy unreadiness, a smaller proportion of Asian children of foreign born mothers than native-born mothers demonstrate numeracy unreadiness: 13 percent of children with native-born mothers fall in the 'unready' category and 7 percent of children with foreign-born mothers are classified as such.

The foreign-born school readiness decrement is particularly conspicuous in the general knowledge domain, in which higher proportions of Mexican, Puerto Rican, and other Hispanic children of foreign-born mothers demonstrate unreadiness than their co-ethnic counterparts with native-born mothers (Figure 3.3). Non-Hispanic white children also demonstrate a significant general knowledge readiness disadvantage among the children of foreign-born mothers, though the gap is narrower and the overall levels lower than those of the aforementioned groups.

As in the previously discussed dimensions of school readiness, non-Hispanic black and Cuban children do not demonstrate evidence of foreign-born/native-born mother general knowledge readiness inequality. While Cuban children's unreadiness levels in literacy, numeracy, and general knowledge appear to vary by generational status, the relatively small size of the Cuban sample (N = 62) results in inflated standard error estimates when conducting significance tests of mean generational status differences, making rejection of the null hypothesis improbable.

Unlike the literacy and numeracy dimensions of school readiness, general knowledge readiness favors Asian children of native-born mothers over their counterparts with foreign-born mothers. Among Asians, 11 percent of children with native-born mothers are coded 'unready' on general knowledge, while 25 percent of those with foreign-born mothers are categorized as such. Asian immigrant families, it would seem, are better able to facilitate resilience to immigration-related disadvantages in terms of their children's pre-reading and mathematics skills than in their knowledge of the physical and social world, as measured by the ECLS-K's general knowledge battery.

Aside from a small, statistically significant difference among non-Hispanic white children, there are no appreciable or statistically significant foreign-born/native-born mother differences in behavioral school unreadiness, as measured by teacher-reported approaches to learning (Figure 3.4). A distinct pattern of unreadiness across groups is also difficult to identify, as there appears to be relatively little variation in behavioral school readiness associated with race/ethnicity and national origin.

Explaining School Readiness Differentials

Table 3.2 presents the results of random effects logit models estimating students' odds of unreadiness in each performance domain relative to non-Hispanic white children of native-born mothers. These models provide estimates of the extent to which the racial/ethnic group disparities evident in Figures 3.1 through 3.4 can be accounted for by children's background characteristics. Models for each of the four outcomes presented in Table 3.2 were constructed using the Akaike information criterion (AIC), Bayesian information criterion (BIC), and log-likelihood to maximize model fit. The specific set of covariates differs between models, as the inclusion of a given variable may have improved the model fit for one outcome without contributing to the model fit for another.

Table 3.2 presents two models for each outcome. Model 1 includes only race/ethnicity, national origin, and generational status as predictors of unreadiness, giving an overall picture of between-group differences that replicates findings presented in Figures 3.1 – 3.4. Model 2 controls for a set of child and family background variables, thereby presenting a conditional likelihood of unreadiness for children from each group. Table 3.2 only reports the results of models with non-Hispanic white children of American-born mothers as the reference category. However, additional models were estimated in which children of native-born mothers from each racial/ethnic and national origin group were set as the reference categories, allowing for within-group foreign-born/native-born comparisons. Where children of foreign-born and native-born mothers from the same racial/ethnic group were statistically different from one another ($p < .05$, two-tailed), this difference is indicated by italicized odds ratios.

[TABLE 3.2 HERE]

The results from Model 1 for each school unreadiness outcome mirror the informal comparisons drawn from Figures 3.1 through 3.4. According to Model 1, black and Hispanic children (except Cubans) tend to demonstrate higher odds of unreadiness than non-Hispanic white children of native-born mothers in literacy, numeracy, and general knowledge. Additionally, black and Mexican children in both generational status categories and Puerto Rican children of native-born mothers have higher odds of behavioral unreadiness than non-Hispanic white children of native-born mothers. Asian children of native-born mothers tend not to differ significantly from non-Hispanic white children of native-born mothers, while Asian children of foreign-born mothers have significantly lower odds of unreadiness in numeracy and higher odds of unreadiness in general knowledge than non-Hispanic white children of native-born mothers.

Model 1's within-group comparisons also tend to reflect the patterns evident in Figures 3.1 through 3.4. Non-Hispanic white children of foreign-born mothers have higher odds of unreadiness than white children of native-born mothers in the general knowledge and approaches to learning domains. Mexican, Puerto Rican, and other Hispanic children of foreign-born mothers are disadvantaged relative to third-plus generation co-ethnic children in literacy, numeracy, and general knowledge readiness.

Consistent with Figures 3.1-3.4, Asian children demonstrate a significant school readiness advantage among the children of foreign-born mothers in the literacy and numeracy dimensions, but a native-born mother advantage in general knowledge readiness. Black and Cuban children's likelihood of school unreadiness does not differ by mother's nativity along any readiness dimension.

Model 2 introduces additional covariates to each random-effects logit model. Results from these models indicate that a substantial portion of the racial/ethnic, national origin, and generational status differentials in school readiness evident in the unconditional models and Figures 3.1- 3.4 are accounted for by child gender and measures of family context.

In terms of literacy, numeracy, and approaches to learning, boys are more likely than girls to be unready for school. The opposite relationship holds for unreadiness in general knowledge, where girls experience a disadvantage. Family socioeconomic status is a significant predictor of school unreadiness in all dimensions, with children from higher-SES backgrounds facing lower odds of unreadiness. Likewise, higher family income is associated with lower odds of unreadiness in all dimensions except behavior. Children from families below the federal poverty threshold have higher estimated odds of unreadiness in literacy, numeracy, and general knowledge. Parental education demonstrates an association with children's odds of unreadiness, with children of college-educated parents (mothers in particular) facing lower odds of unreadiness along each dimension in which the variables contributed to the model fit and were therefore included as covariates.

Families' educational resources and activities are associated with lower odds of school unreadiness, as the number of books in the home, the presence of a home computer, and children's participation in enrichment activities. Despite being an intervention aimed specifically at improving children's school readiness skills, Head Start attendance is associated with increased likelihood of unreadiness in numeracy and behavior, and was not a predictor of unreadiness in literacy or general knowledge. One interpretation of this finding is that the present statistical models do not sufficiently account for selection bias resulting from the fact that Head Start programs serve an educationally disadvantaged population.

Controlling for this array of child and family background variables, the results of Model 2 portray partially diminished relationships among race/ethnicity, mother's nativity, and school readiness relative to those revealed in the unconditional comparisons (Figures 3.1-3.4 and Models 1 in Table 3.2). Once children's odds of unreadiness are adjusted for family resources and gender, the gap between non-Hispanic white and black children is largely explained and no longer statistically significant, and the gaps in numeracy, general knowledge, and behavior unreadiness are all substantially reduced.

Gaps between Mexican and non-Hispanic white students are reduced in literacy, numeracy, and general knowledge unreadiness, and are almost fully explained and no longer statistically significant in the behavior dimension.

Unreadiness differences between Puerto Rican and non-Hispanic white children of native-born mothers are partially explained for literacy, numeracy general knowledge, and behavior, with only the literacy readiness gap remaining statistically significant. For Puerto Rican children of foreign-born mothers, the disadvantages relative to non-Hispanic white children are partially explained for literacy, numeracy, and general knowledge unreadiness but are still statistically significant. Other Hispanic children of native-born mothers no longer significantly differ from non-Hispanic white children of native-born mothers in their likelihood of literacy or numeracy unreadiness after the addition of additional covariates, and the gap in odds of general knowledge unreadiness is reduced by 14 percent.

In contrast to the groups discussed above, for whom the inclusion of family background measures decreases their predicted difference from non-Hispanic white children of native-born mothers, Asian children of foreign-born mothers demonstrate greater predicted differences from non-Hispanic whites in literacy and numeracy unreadiness in Model 2. That is, after adjusting these children's estimated odds of unreadiness for their generally disadvantageous family backgrounds, they have lower predicted odds of unreadiness than non-Hispanic white children (71 percent lower for literacy and 66 percent lower for numeracy).

Even before accounting for family background differences, Asian children of immigrant mothers had a lower likelihood of experiencing numeracy unreadiness than non-Hispanic white children of native-born mothers. Controlling for family background magnifies this difference. This finding highlights the resilience to socioeconomic disadvantage demonstrated by Asian immigrant families, who appear quite successful in preparing their children to begin school in terms of their literacy and numeracy skills.

With respect to the general knowledge domain, in which Asian children of foreign-born mothers possess higher predicted odds of unreadiness than non-Hispanic white children of native-born mothers, the inclusion of family background controls narrows, but does not completely explain the gap.

Measures of family background introduced in Model 2 are more effective in explaining foreign-born/native-born mother differences in some groups than others. Among non-Hispanic white children, the unconditional model predicted increased odds of general knowledge and behavior unreadiness among children of foreign-born mothers. The inclusion of additional covariates in Model 2 accounts for these differences. For Mexican and Puerto Rican children, family background measures largely explain foreign-born/native-born mother gaps in numeracy unreadiness, but children of foreign-born mothers continue to demonstrate disadvantages in literacy and general knowledge domains of school readiness. Generational status differences among other Hispanic children are reduced to non-significance by family background in the literacy and numeracy domains, but not in the general knowledge domain.

Among Asian children, controlling for family background characteristics increases the predicted difference between children of foreign-born and native-born mothers with respect to literacy and numeracy unreadiness. Children in the former group demonstrate lower predicted odds of unreadiness. In the general knowledge domain, there are no significant differences between children of foreign-born and native-born mothers in Model 2.

The final within-group comparison that changes between Models 1 and 2 can be observed in the general knowledge domain among non-Hispanic black children. In the unconditional model, black children with native- and foreign-born mothers are predicted to experience equivalent odds of general knowledge unreadiness. However, Table 3.1 illustrates children of black immigrant mothers' relative advantage compared to children of native-born mothers (particularly along economic lines). Thus, one may expect lower odds of general knowledge unreadiness among black children of foreign-born mothers, but the data do not bear this out. Children of foreign-born mothers are more likely to exhibit general knowledge unreadiness compared to children of native born mothers.

Discussion

As a descriptive examination of school readiness differentials, this chapter highlights the wide variation in early academic experiences across racial/ethnic minority and generational status groups. It is impossible to draw broad, sweeping conclusions about 'minority' or 'generational status' effects writ large; race/ethnicity, national origin, and mother's nativity interact with one another to shape children's school readiness outcomes. In addition to variation across groups, patterns of advantage and disadvantage shift depending on the dimension of readiness being measured.

Of the four domains of school readiness examined in this chapter, early literacy skill is probably the most frequently implicated as a precursor to subsequent academic success (Hart and Risley 1995, Farkas and Beron 2004, Morgan et. al 2008). In terms of their raw literacy unreadiness levels, non-Hispanic black, Mexican, Puerto Rican, and Other Hispanic children are at particular risk, while Asian and Cuban children have statistically equivalent odds of unreadiness to those of non-Hispanic white children. For Mexican, Puerto Rican, and other Hispanic children, the odds of literacy unreadiness are much higher among the children of foreign-born mothers, yet Asian children of foreign-born mothers have lower odds of literacy unreadiness than their counterparts with U.S.-born mothers. Generational status does not differentiate non-Hispanic white, non-Hispanic black, or Cuban children's odds of unreadiness.

According to the thirteen measures of family context reported in Table 3.1 and included in these analyses, non-Hispanic black, Mexican, Puerto Rican, and other Hispanic children tend to spend their early years in disadvantageous contexts relative to non-Hispanic white and Asian children. When the influence of these variables on literacy unreadiness is modeled, three major findings emerge. The first is that a substantial portion of the school readiness disadvantage exhibited by black, Mexican, Puerto Rican, and other Hispanic children is attributable to their less resource-rich home environments. The differences in odds of literacy unreadiness between non-Hispanic white children of native-born mothers and black children in both generational status categories and other Hispanic children of native-born mothers are largely explained by the measures of family context. The differences in odds of unreadiness for the other disadvantaged groups are all reduced by the inclusion of family background measures.

The second major finding regarding literacy unreadiness involves foreign-born/native-born mother differences within racial/ethnic and national origin groups. For

Mexican and Puerto Rican children, intra-ethnic generational status differences persist after the inclusion of family background measures in models. Family background measures largely account for the generational status difference in odds of literacy unreadiness among other Hispanic children, however.

The final major finding revealed by the analysis of literacy unreadiness is that Asian children demonstrate a wholly different pattern of school readiness than non-Hispanic black, Mexican, Puerto Rican or other Hispanic children. Rather than mitigating the unequal odds of unreadiness evident in Model 1, the family background measures introduced in Model 2 predict wider gaps in literacy unreadiness between Asian children of foreign-born mothers and white children of native-born mothers as well as greater inequality between Asian children of foreign- and native-born mothers. Furthermore, this inequality exists in the opposite direction of the inequality demonstrated by other racial/ethnic and national origin groups – Asian children of foreign-born mothers are better-off than both their third-plus generation co-ethnics and non-Hispanic children of native-born mothers. The present analysis suggests than Asian immigrant families are able to foster literacy readiness in spite of their socioeconomic circumstances.

While early mathematics skills have received somewhat less research attention than early literacy skills (e.g., Ginsburg and Russell 1981, Morgan, Farkas, and Wu in press), the present study indicates that children of different racial/ethnic, national origin, and generational statuses enter kindergarten with numeracy readiness levels that vary just as widely as literacy readiness. Moreover, patterns of inequality in children's odds of numeracy unreadiness vary along similar lines.

Non-Hispanic black, Mexican, Puerto Rican, and other Hispanic children have elevated likelihoods of numeracy unreadiness compared to non-Hispanic white children of native-born mothers. Asian children of native-born mothers have comparable odds and those with foreign-born mothers have lower odds of numeracy unreadiness than non-Hispanic whites, however. Family context measures account for portions of these white/minority gaps for black and Mexican children in both generational status categories and Puerto Rican and other Hispanic children of foreign-born mothers. After including these measures in models, Puerto Rican and other Hispanic children of native-born mothers have statistically equivalent predicted likelihoods of numeracy unreadiness to non-Hispanic white children.

In the same way that controlling for family background measures increased the gap in predicted odds of literacy unreadiness between non-Hispanic white children of native-born mothers and Asian children of foreign-born mothers, Model 2 predicts even lower odds of unreadiness among Asian children of foreign-born mothers than the unconditional model (Model 1).

Within-group foreign-born/native-born mother differences in numeracy unreadiness appear to be more strongly tied to family background than intra-group differences in literacy unreadiness. Family background characteristics largely explain these intra-ethnic differences for Mexican, Puerto Rican, and other Hispanic children. As with literacy unreadiness, however, accounting for family context results in a larger predicted generational status difference in numeracy unreadiness among Asian children.

Within-group comparisons of general knowledge readiness reveal that children of immigrant mothers are particularly likely to possess lower levels of "knowledge of the physical and *social* worlds" than children of native-born mothers. This should perhaps be unsurprising, for two reasons. First, the general knowledge test has the potential to rely more strongly on a culturally specific repertoire of knowledge than a test of letter or number knowledge. Additionally, non-English-proficient children were excluded from the general knowledge test and coded as 'unready' as a result. This artifact of variable construction likely leads to more children of foreign-born mothers being coded as 'unready' in general knowledge.

Non-Hispanic white and Asian children of foreign-born mothers, non-Hispanic black, Mexican, Puerto Rican, and other Hispanic children in both generational status categories are significantly more likely than non-Hispanic children of native-born mothers to be unready for school in terms of general knowledge. While family background accounts for a portion of these differences for all groups, family context variables only reduce the gap between for white children of foreign-born mothers and Puerto Rican children of native-born mothers to statistical non-significance. Likewise, intra-ethnic differences are robust to the introduction of family background measures, as these gaps persist for non-Hispanic black, Mexican, Puerto Rican, and other Hispanic children. Given the general knowledge domain's partial reliance on knowledge of the social world, it may be that the cultural familiarity with American society gained as a result of higher generational status is more salient, and socioeconomic resources less salient, for general knowledge readiness than literacy or numeracy readiness. Again, however, the differential selection of children who did not pass the OLDS test into the 'unready' category may bias this result.

While general knowledge skills are rarely the focus in studies of educational stratification, scores on such tests may provide insight into the cultural capital acquisition process. General knowledge skills as measured by the ECLS-K may reflect a particular type of parenting, termed *concerted cultivation,* in which parents strive to increase their children's knowledge and familiarity with a broad range of social, cultural, and academic topics (Lareau 2003). Children who possess knowledge across a broad range of domains may be able to signal their competencies more effectively to important adults in school (e.g., teachers) as well as later in life (e.g., potential employers) (Cheadle 2005). Results from the present chapter suggest that children of immigrants may be less able to present these social capital cues to their kindergarten teachers, a disadvantage that could lead to those teachers holding inaccurately low expectations for first/second generation children's academic potential.

The final domain of school readiness examined in the present study, behavioral readiness, is indicated by teachers' ratings of children's approaches to learning in the fall of kindergarten. The present study finds that non-Hispanic white children of foreign-born mothers, Puerto Rican children of native-born mothers, and Mexican and black children in both generational status categories are more likely than non-Hispanic white children of native-born mothers to exhibit behavioral unreadiness. However, family background reduces these differences to non-significance for all groups except black children of foreign- and native-born mothers. Net of their family background characteristics, black children remain more likely than non-Hispanic whites to receive low classroom behavior scores, and generational status is not associated with different odds of behavioral unreadiness for black children.

Prior research has identified a tendency for children from low-social status minority groups to be evaluated less positively than students from racial/ethnic majority and high-status backgrounds (Alexander et. al 1987, Downey and Pribesh 2004). A *cultural discontinuity* perspective (e.g., Ogbu 1982) on this phenomenon suggests that black students may find themselves out of place in an institution designed to foster and reward the behavioral qualities defined as ideal by the dominant cultural group. Minority students may experience a disconnect between the modes of behavior that are reinforced in their outside-of-school life and those that are expected of them in the classroom. By the same token, teachers are trained to demand a particular mode of classroom conduct defined by the cultural majority and to be relatively intolerant of alternative behaviors. Cultural discontinuity may create a system in which members of the racial/ethnic minority begin school poorly prepared to succeed in the classroom setting, and are disproportionately evaluated as below-average students as a consequence.

Limitations

As a study of assimilation and the effects of generational time, this study faces prohibitive data limitations that necessitate mention. The data do not include sufficient information to identify the national origin backgrounds of more than a select few native-born individuals, making within-group comparisons across generations impossible for some Hispanic groups and all Asian groups. Additionally, the ECLS-K sample is a single cohort of American children and their families followed over time. Thus, school readiness differences that may appear to be effects of assimilation may in fact be produced by differences in the economic, human, social, or cultural capital possessed by recent immigrants relative to their earlier-arriving counterparts. In other words, if contemporary immigrants are more or less educationally advantaged than earlier immigrants, generational status differences may be caused by unmeasured exogenous factors and not by groups' assimilation trajectories.

An ideal study of divergent assimilation trajectories would follow the same immigrant families across multiple generations, effectively controlling for the influences of historical context and immigrant cohort composition that potentially bias the cross-cohort comparisons made in the present study. Of course, a research design of this sort would be extremely time- and resource-intensive, which may be one reason why even the most prominent assimilation researchers often rely on single-cohort data to test assimilation hypotheses, in many cases without making mention of the inherent limitations cross-sectional data impose (e.g., Hirschman 2001, Kao and Tienda 1995, 2005, Leventhal, Xue, and Brooks-Gunn 2006, Pong, Hao, and Gardner 2005).

A second point highlighted by this study involves the importance of taking national origin into account when examining racial/ethnic differences. A wealth of empirical research – this study included – indicates that national origin designations are more useful in describing and predicting individuals' life outcomes than the overly general pan-ethnic labels frequently used by social scientists. The present study's findings of intra-ethnic differences in school readiness among Mexican, Puerto Rican, Cuban and other Hispanic children throws the deficiency in this study's regrettably necessary reliance on a pan-ethnic 'Asian' label into sharp relief. Members of typically high-achieving national origin groups such as Koreans, Indians, and Japanese are subsumed alongside members of much more disadvantaged groups such a Hmong, Vietnamese, and Filipinos into the Asian racial/ethnic group. It can only be assumed that much detail is lost as a result.

Finally, item non-response results in the analytic sample differing from the original, nationally representative ECLS-K sample. This item non-response is likely non-random, introducing possible selection bias to the analysis. While this possibility is at least partially addressed by the use of probability weights supplied with the ECLS-K, it cannot be ruled out.

TABLES

Table 3.1, Means/Sample Proportions by Race/Ethnicity and Foreign-Born (FB)/Native-Born (NB) Mother

	White FB Mother	White NB Mother	Black FB Mother	Black NB Mother	Mexican FB Mother	Mexican NB Mother	Puerto Rican FB Mother	Puerto Rican NB Mother	Cuban FB Mother	Cuban NB Mother	Other Hisp. FB Mother	Other Hisp. NB Mother	Asian FB Mother	Asian NB Mother
Family SES (*Z*-score)	0.22	0.31	-0.32	-0.47	-0.94	-0.23	-0.55	-0.17	0.26	0.59	-0.37	-0.06	0.31	0.63
Family Income (Median)	$45,500	$55,000	$24,000	$22,000	$20,000	$34,000	$28,000	$35,000	$36,000	$60,000	$25,000	$45,000	$45,000	$60,000
Below Federal Poverty Line	0.12	0.08	0.38	0.42	0.52	0.21	0.35	0.21	0.13	0.13	0.33	0.16	0.21	0.08
Central City	0.36	0.30	0.66	0.55	0.65	0.55	0.64	0.60	0.77	0.70	0.66	0.49	0.53	0.38
Mother Attended College	0.60	0.66	0.45	0.47	0.15	0.48	0.40	0.48	0.72	0.87	0.44	0.53	0.62	0.84
Father Attended College	0.54	0.57	0.26	0.22	0.14	0.35	0.29	0.30	0.56	0.70	0.32	0.41	0.68	0.76
Attended Head Start	0.08	0.07	0.36	0.41	0.22	0.20	0.28	0.18	0.05	0.04	0.16	0.15	0.16	0.06
Number of Books in Home	83	98	40	40	21	65	37	52	43	86	36	73	43	95
Home Computer	0.62	0.69	0.39	0.35	0.22	0.46	0.38	0.49	0.56	0.83	0.38	0.56	0.63	0.66
Arts and Crafts	0.13	0.16	0.10	0.10	0.04	0.11	0.03	0.08	0.05	0.13	0.09	0.17	0.13	0.16
Performing Arts	0.28	0.32	0.23	0.32	0.08	0.25	0.16	0.17	0.28	0.57	0.21	0.28	0.30	0.33
Sports/Clubs	2.18	2.29	2.04	1.95	1.88	2.04	2.03	2.00	1.64	2.17	1.94	2.11	2.04	2.28
Educational Trips	1.78	1.68	1.60	1.63	1.24	1.75	1.50	1.49	1.67	1.87	1.54	1.79	1.85	1.93
Group n	674	7,525	353	1,449	712	505	58	112	39	23	288	408	581	109

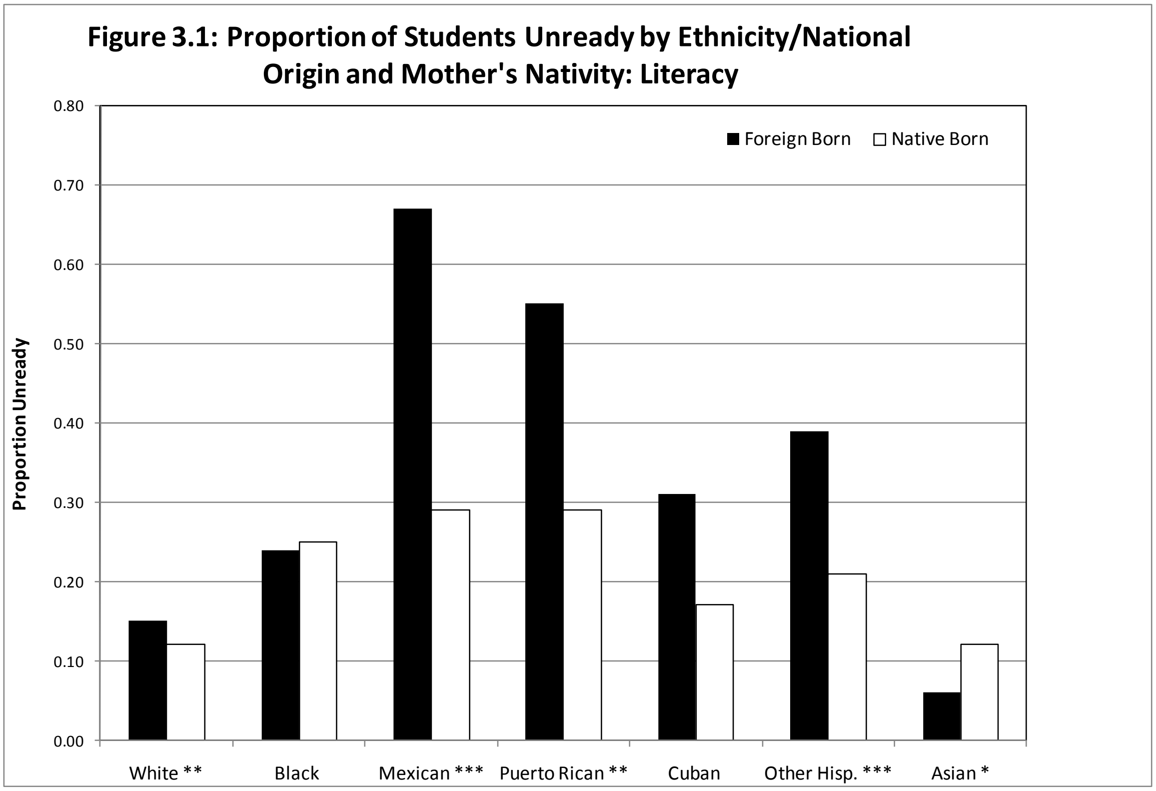
Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99

Table 3.2 Random-Effects Logit Models for Multiple Dimensions of School Unreadiness (coefficients reported a

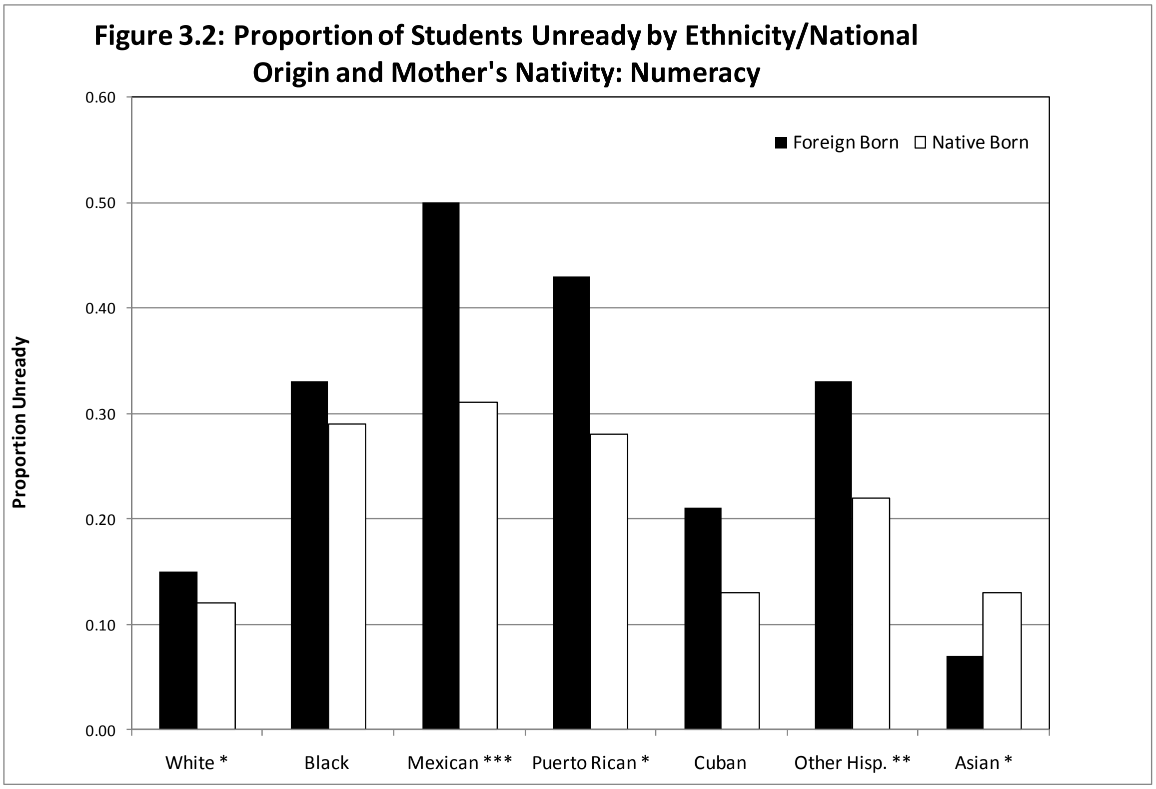
	Literacy		Numeracy		General Knowledge		
Race/Ethnicity and Generational Status Variables	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2	M
White FB	1.02	0.96	1.07	0.96	1.33*	1.24	1.2
Black NB	2.02***	1.04	2.37***	1.25**	5.18***	2.90***	2.0
Black FB	1.83***	0.97	2.91***	1.61**	6.76***	3.93***	2.4
Mexican NB	1.99***	1.51**	2.67***	1.93***	2.29***	1.66***	1.3
Mexican FB	8.88***	3.92***	4.73***	1.99***	14.19***	6.21***	1.4
Puerto Rican NB	2.61***	1.69*	2.33***	1.58	1.89*	1.23	1.9
Puerto Rican FB	7.78***	4.64***	4.21***	2.44**	9.16***	5.32***	1.5
Cuban NB	1.14	1.48	0.96	1.17	0.73	0.86	1.2
Cuban FB	1.75	1.71	1.54	1.26	1.61	1.36	1.2
Other Hispanic NB	1.46**	1.20	1.52**	1.27	2.17***	1.86***	1.1
Other Hispanic FB	3.29***	2.02***	2.51***	1.51**	7.42***	4.46***	1.2
Asian NB	0.90	1.06	0.92	1.17	1.22	1.50	1.0
Asian FB	0.42	0.29***	0.49***	0.34***	3.24***	2.50***	0.9
Child and Family Demographic Variables							
Male	---	1.32***	---	1.14*	---	0.84**	---
Family SES	---	0.74***	---	0.75***	---	0.79***	---
Family Income	---	0.99***	---	0.99***	---	0.99*	---
Poverty Status	---	1.54***	---	1.32***	---	1.46***	---
Father Attended College	---	0.87*	---	---	---	0.86*	---
Mother Attended College		0.67***		0.69***		0.78***	

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K)

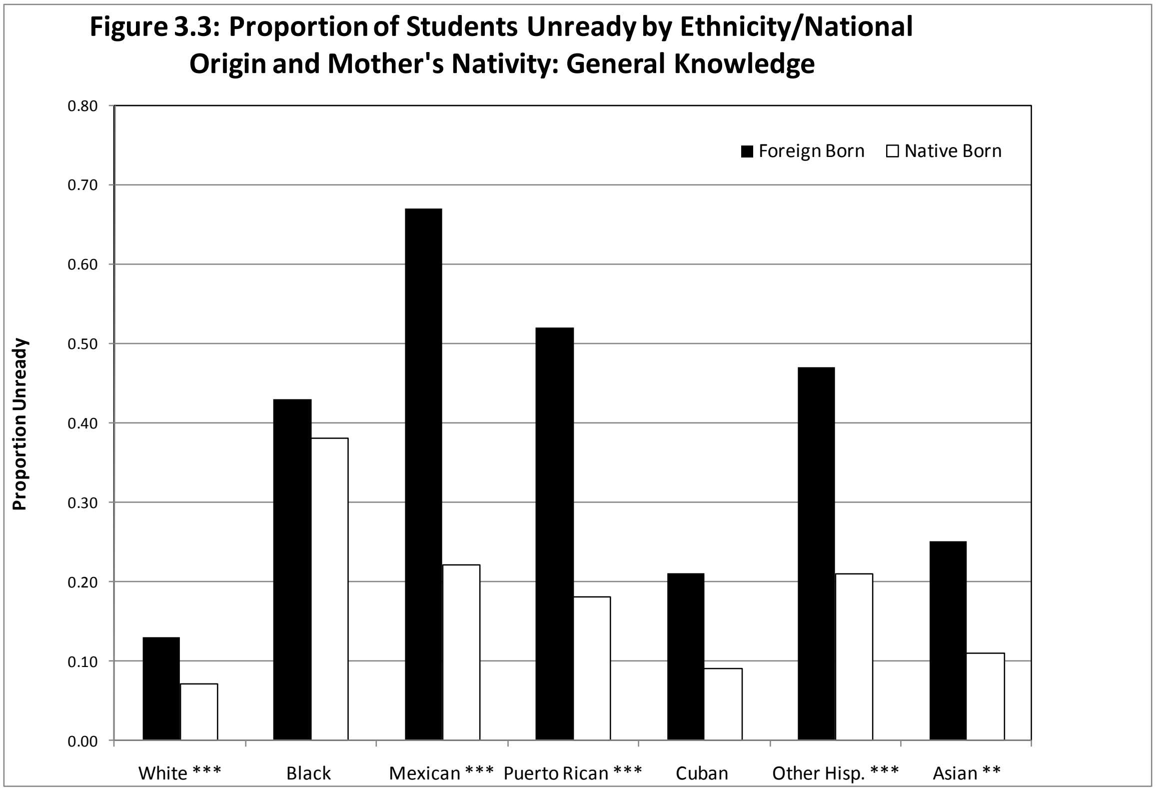
Figures



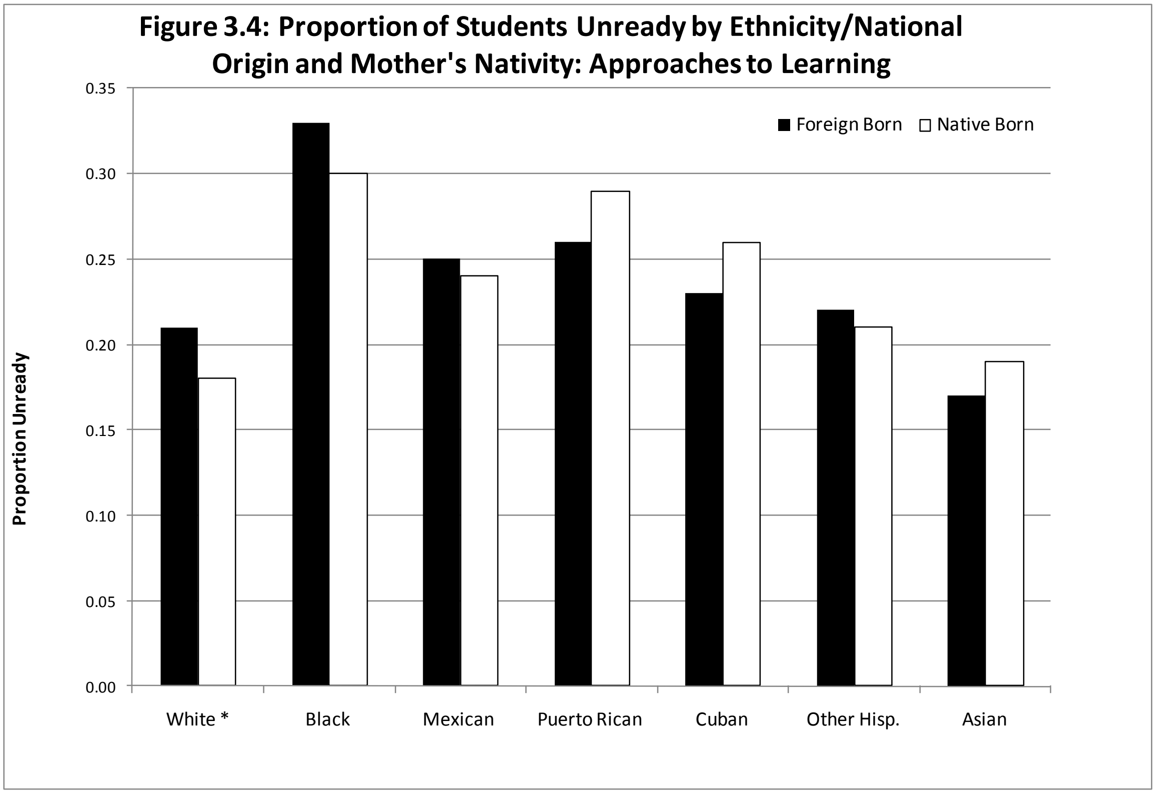
Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K)



Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K)



Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K)



Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K)

CHAPTER 4

Kindergarten through Eighth Grade Reading and Mathematics Ability Growth:

Modeling the Influence of Generational Status, Race/Ethnicity, Country of Origin, and School/Community Context

Introduction

This chapter extends the analysis presented in Chapter 3 by comparing kindergarten through eighth grade[30] reading and mathematics ability growth trajectories of children from different racial/ethnic, national origin, and generational status groups. Whereas Chapter 3 focuses on children's abilities at the time of school entry, the present chapter examines questions of over-time academic inequality. The analysis asks whether schooling truly is "the great equalizer" (Downey et al. 2004), reducing initial inequalities over time, or whether initially disadvantaged children continue to fall further behind as the years progress.

In addition to examining patterns of achievement associated with race/ethnicity, generational status, and immigrant national origin, analyses in the present chapter bring attention to the role of school and community context. If schools influence achievement gaps between the children of immigrant parents and the children of native-born parents, what type of school context yields the most favorable outcomes? Do children

[30] While I refer to the final wave of data collection as "the eighth grade year", not all children in the sample were finishing eighth grade at this time. ECLS-K participants who were retained or advanced one or more grade levels were finishing a different grade in the spring of 2007.

of immigrants tend to experience more positive outcomes when they live and attend school in immigrant enclaves, surrounded by other coethnic children?

The present chapter addresses three research questions:

(1) How does kindergarten through eighth grade ability growth vary from one child to another, and what proportion of this variation resides within children, between children, and between schools?
(2) Can race/ethnicity, national origin, and generational status account for any predicted differences in children's reading and mathematics ability trajectories?
(3) Do immigrant enclaves play a role in shaping the academic ability growth of the children of foreign-born and native born mothers?

Results

Descriptive Statistics

Table 4.1 presents descriptive statistics for all analytic variables.

[TABLE 4.1 HERE]

Reading and mathematics ability are indicated by children's scores on the ECLS-K's standardized IRT reading and math tests. To provide a sense of the average kindergarten-to-eighth grade growth in scores on each test, descriptive statistics are provided for these test scores at the first and last wave of data collection (fall of kindergarten and spring of eighth grade). The mean reading score at kindergarten entry was 36.20, growing to an average of 171.46 by the end of eighth grade. The average math score at kindergarten entry was 27.77, and increased to 142.72 by the end of the eighth grade year. Additional scores were collected in the spring of kindergarten, spring of first grade, fall and spring of third grade, and fall and spring of fifth grade. Each of these ability measures is used to estimate the mixed-effects models of reading and mathematics ability growth.

Descriptive statistics also indicate that the analytic sample is composed of 61.4 percent third-plus generation non-Hispanic white children. Non-Hispanic black children of native-born mothers are the next largest group, comprising 8.1 percent of the sample, followed by Mexican children of foreign-born mothers (5.3 percent), non-Hispanic white children of immigrant mothers (4.5 percent), Asian children of foreign-born mothers (4.3 percent), and Mexican children of native-born mothers (3.5 percent). The remaining groups each make up less than 3 percent of the sample.

The analytic sample is composed of 50 percent boys and 50 percent girls. Family SES represents children's scores on the ECLS-K's SES scale, measured in third grade. This measure was standardized across all available respondents in the spring eighth grade wave of data collection.

Community immigrant concentration is indicated by a standardized, log-transformed, additive index of the proportion of residents in a zip-code who were foreign born in 2000 and the proportion of the zip-code's households that were linguistically isolated[31]. The measures of school percent free and reduced-price school lunch enrollment and percent non-white enrollment were provided by school principals, and range from 0 to 100 (as opposed to 0 to 1).

Unconditional Mixed-Effects Models of K-8 Reading and Mathematics Ability Growth

As discussed in Chapter 2, a chief insight provided by the mixed-effects model relates to variance partitioning. The three-level models of reading and mathematics ability growth developed in this section provide estimates of within-child variability in test scores over time, between-child variability in ability growth, and between-community variability in children's average ability growth.

The first step in the examination of this multilevel variance structure involves setting a benchmark for the proportion of variance occurring at each level of the analysis. Baseline variance partitioning is typically provided by an unconditional means model, which constrains the slope parameter to be equal to zero. As a result, the level-1 variance component reflects the dispersion of each child's test scores around his or her single, time-invariant, person-specific mean. In an unconditional means model, the level-1 variance component reflects the total variance in test scores within each child.

However, since this analysis examines growth in reading and mathematics ability from the beginning of kindergarten through the end of eighth grade, each child's scores

[31] Linguistic isolation occurs when all household members speak a non-English language, and no member of the household over the age of 14 speak English "very well" (Siegel, Martin, and Bruno 2001)

(and the abilities they represent) vary enormously across assessment waves – ranging, for example, from the most rudimentary understanding of language as a kindergartner through a more adult-like ability to read as an adolescent. When the effect of time (which, in this case, serves as a proxy for both quantity of exposure to instruction and developmental processes influencing cognitive ability), this tremendous within-child heterogeneity completely overwhelms the actual population variance in ability growth. As a result, the benchmark variance partitioning must occur after an initial modeling step has been taken whereby all children's scores are assumed to increase from kindergarten through eighth grade at the same (nonlinear)[32] rate.

Because the slope parameter is fixed, differences between children can only be expressed as differences in elevation of the growth trajectory (i.e., variation in the values of their person-specific intercepts). Within-child variation is then expressed as the level-1 residual variance, which captures each child's scatter around the population average growth trajectory. Finally, a third variance component, the level-3 or between-community component, captures variation in average child-specific intercepts between areas with different zip codes. Results from this initial model are presented as Model 1 in Table 4.2.

[TABLE 4.2 HERE]

As with most other examinations of variance components in regression models, the particular value of the variance measure in a mixed-effects model is of less interest

[32] See the Appendix for an in-depth description of the model specification process, including the argument for the use of a quadratic functional form to describe reading and mathematics ability growth.

than either the proportion of unexplained variance at each level prior to introducing controls or the amount of this unexplained heterogeneity accounted for in subsequently more complex models.

The intraclass correlation coefficient (ICC) provides the benchmark estimate for the amount of variation between groups. The ICC is a simple expression of the proportion of total variance residing at the between-individual level (level-2). However, because the models in the present analysis incorporate two levels of nesting (time points within children and children within communities), there are two ICCs to calculate: ICC_i, which indicates the proportion of total variance residing at level-2 (between individuals), and ICC_k, which indicates the proportion of variance residing at level-3 (between communities).

Using Model 1 in Table 4.2 as the benchmark for determining the distribution of variance in reading and mathematics ability growth among the within-child, between-child, and between-community levels, the value of ICC_i (reported in the third panel of Table 4.2) is estimated to be 0.51 for reading and 0.56 for math, and the value of ICC_k is estimated at 0.16 for reading and 0.15 for mathematics (leaving approximately 0.34 as the proportion of total variance residing at level-1 for reading and 0.29 for math). These ICC values imply that more than half of the total population variance in ability growth is associated with differences between children, 15 to 16 percent is associated with differences between school/community contexts, and 29 to 34 percent is attributable to within-child variance (i.e., variation around the population mean growth trajectory). At the risk of belaboring the point, note that this variance breakdown reflects the explicit modeling of a quadratic effect of time, and is therefore not a classic unconditional means model. However, without the inclusion of this level-1 predictor, the level-2 and level-3 ICC values would be effectively zero, as nearly all variation in test scores would appear to reside within children.

Model 1's fixed effects (reported in the top panel of Table 4.2) indicate the average child begins kindergarten with a reading ability score of 32.65 and a mathematics ability score of 26.27. The linear and quadratic growth terms yield a positive concave curve in which growth is most rapid in the early years and slows as time goes on. In other words, while children's ability continues to grow throughout elementary and middle school, they make proportionately smaller gains with each passing year. This feature of the reading and mathematics ability growth curves is consistent with research highlighting the importance of earliest years of schooling in preparing children for future academic success (e.g., Entwisle et. al 1997).

Model 2 expands upon Model 1 by allowing the growth parameters to vary randomly at the child and school/community levels. The statistically significant level-2 and 3 variance components (reported in the second panel of Table 4.2) associated with "Semester" and "Semester^2" indicate that there is substantial between-child and between-school variation in K-8 test score growth.

While including these random effects leads to little change in the fixed-effects estimates, the models' variance properties undergo considerable change. The multilevel nature of the mixed-effects model precludes the calculation of a traditional R^2 statistic (Raudenbush and Bryk 2002). However, a 'Pseudo-R^2' value, which represents the ratio of unexplained heterogeneity associated with each fixed-effect in a given model relative to the heterogeneity in the baseline model, can be calculated. Thus, the Pseudo-R^2 reflects the proportionate change in each variance component from one model specification to the next. Observing the Pseudo-R^2 values in the bottom panel of Table 4.2, one finds that the inclusion of random effects on the level-2 and 3 linear and quadratic growth terms results in a 46 percent decrease in unexplained level-1 variance for reading and 50 percent for math, a 77 percent decrease in unexplained level-2 variance for reading and 79 percent for math, and a 73 percent decrease in level-3 variance for reading and 70 percent for math.

Taken together with Model 2's significantly lower deviance statistics, the Pseudo-R^2 values indicate that a random-slopes model is a much better fit to the data than a fixed-slope model. Children differ from one another in their reading ability trajectories – both within and between schools – and a one-size-fits-all model of development is a poor description of the K-8 reading and mathematics ability growth processes. However, despite the improvement in model fit gained by allowing slopes to vary between children and schools, significant unexplained variation still exists at each level of Model 2.

The inclusion of random slope coefficients in Model 2 alters the interpretation of the level-1 residuals. In Model 1, wherein each child was constrained to the same population-average developmental trajectory, the level-1 residual and its variance represented individuals' deviation from the population mean trajectory. However, when slopes are free to vary across individuals, the level-1 residual reflects child-specific measurement error – the child-specific scatter of observed ability scores around his or her true reading ability trajectory[33].

In addition to the random slope parameters, Model 2 also introduces measures of the population covariance of the level-2 residuals (reported as correlations). Two of these covariances are reported: those describing the relationship between the intercept and each growth parameter. The third covariance parameter, measuring the association between the linear growth term residual and the quadratic growth term residual is, as one might expect, quite high and stable across all models[34]. These population covariance measures quantify the relationship between true initial status and true rate of change (Singer and Willett 2003). Their values in Model 2 suggest a strong relationship between reading ability at kindergarten entry and subsequent growth, such that children with higher initial levels of reading or mathematics ability experience both steeper initial ability growth and a sharper decline in growth in later years. Extrapolated to the entire population of American children, this correlation is indicative of a "fan-spread" or "Matthew" effect, whereby initially advantaged individuals or groups grow increasingly advantaged over time (Kerckoff and Glennie 1999).

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[33] A valid estimation of a child's true ability trajectory is of course dependent on the quality of the model. While the level-1 residual theoretically captures only random measurement error, this is the case only when the model is perfectly specified. In incompletely specified models (which Model 2 surely is), the residual also captures unexplained systematic variation.

[34] All indications suggest a "ceiling effect" on reading and mathematics ability as measured by the ECLS-K assessments. In other words, children tend to reach "maximum ability" during the study period. In this scenario, it makes intuitive sense that a steeper positive linear component must be associated with a steeper negative quadratic component, as children who reach maximum ability earlier level-off more sharply than students who gain ability at a more gradual pace. Hence there is a strong, negative correlation between the two slope parameters.

Adding Race/Ethnicity and Generational Status to the Mixed-Effects Model

Introducing covariates to the mixed-effects models allows three types of research questions to be addressed: (1) how do the covariates relate to children's reading and mathematics ability at school entry, (2) how do the covariates relate to children's growth trajectories during the K-8 period, and (3) how much unexplained variance do the covariates account for at the within-child, between-child, and between-school/community levels.

Building upon the three-level unconditional growth model (Model 2) presented in Table 4.2, the models in Tables 4.3 and 4.4 examine these three questions with respect to measures of race/ethnicity, national origin group affiliation, generational status, gender, family SES, and community and school demographic characteristics.

[TABLE 4.3 HERE]

[TABLE 4.4 HERE]

Tables 4.3 and 4.4 report the results of conditional mixed-effects models of reading and mathematics ability growth, respectively. Coefficients in Tables 4.3 and 4.4 are estimated with respect to non-Hispanic white children of U.S.-born mothers, and asterisks denote statistically significant differences from this comparison group. In addition, italicized coefficients represent statistically significant ($p<.05$) within-group foreign-born/native-born mother differences. These within-group significance tests are derived from a series of alternative model specifications in which each group's native-born mother category was set as the reference group.

Model 1 in Tables 4.3 and 4.4 predicts reading and mathematics ability growth as a function of generational status, race/ethnicity, and national origin group affiliation. The results of this model suggest that there are substantial initial ability gaps between non-Hispanic white children and children from other backgrounds. Recall that the intercept in these models represents students' predicted reading or mathematics ability after zero semesters of schooling, and thus corresponds to ability at the time of school entry. These initial inequalities provided the focus of the preceding chapter, and given the fact that the same data are examined in the present chapter, it is perhaps unsurprising that the Chapter 3 results are largely mirrored in the intercept coefficients of the Table 4.3 and 4.4 models.

The Chapter 3 models indicated that, without controlling for any additional information, black, Mexican, Puerto Rican, and other Hispanic children demonstrate elevated odds of literacy and numeracy unreadiness, and Asian children of foreign-born mothers possess lower odds of numeracy unreadiness than non-Hispanic white children of native-born mothers. The Model 1 intercept coefficients in Tables 4.3 and 4.4 indicate that non-Hispanic black children of native-born mothers enter school with reading ability scores that are 3.06 points lower than those of non-Hispanic white children of native-born mothers, who have predicted scores of 34.79. Thus, the gap in predicted initial reading ability between white and black children of native-born mothers is 9 percent (3.06/34.79). The 5.00-point initial mathematics ability gap between non-

Hispanic black and white children of native-born mothers can be expressed in similar terms: non-Hispanic black children of native-born mothers exhibit 18 percent lower mathematics ability than non-Hispanic white children of native-born mothers.

Relative to non-Hispanic white children of native-born mothers, Mexican children of foreign-born mothers experience a 22 percent gap in initial reading ability and 28 percent gap in initial mathematics ability, while the initial reading and mathematics gaps for Mexican children of U.S.-born mothers are 7 and 12 percent, respectively. Among Puerto Rican children, those with Puerto Rico-born mothers have 21 percent lower initial mathematics scores than non-Hispanic white children of native-born mothers, and those whose mothers were born in one of the 50 States have 17 percent lower reading and 19 percent lower mathematics ability scores. Other Hispanic children of foreign-born mothers experience a 13 percent gap in reading ability and a 19 percent gap in mathematics ability relative to non-Hispanic white children of native-born mothers, while other Hispanic children of native-born mothers experience a 13 percent gap in initial mathematics ability.

While these results correspond to findings reported in Chapter 3, there are a few instances in which the present chapter's analyses do not line up so neatly. For instance, the Model 1 intercepts from Table 4.3 indicate that non-Hispanic black and Puerto Rican children of foreign-born mothers do not have significantly different levels of initial reading ability from non-Hispanic white children of U.S.-born mothers, nor do other Hispanic children of native-born mothers. In addition, Model 1 indicates that Asian children have higher levels (15 percent for children of foreign-born mothers, 8 percent for children of U.S.-born mothers) of reading ability at school entry than non-Hispanic white children. Table 4.4 results indicate that non-Hispanic black and Asian children of foreign-born mothers do not differ in initial mathematics ability from non-Hispanic white children of native-born mothers, while Cuban children of U.S.-born mothers have higher levels (24 percent) and those with foreign-born mothers have lower levels (23 percent) of initial mathematics ability.

To the extent that these findings appear different from those in Chapter 3, there are two likely causes. First, there is a decrease in statistical power in the present analyses resulting from the smaller sample size used in constructing the mixed-effects model[35]. Because these analyses focus on outcomes over the nine-year period from kindergarten entry through eighth grade, sample attrition substantially reduces the number of children present in the analytic sample, especially when compared to a sample drawn from the initial wave of data collection, when 100 percent of the sample was present. Thus, certain relationships that achieved statistical significance in the high-N scenario do not achieve significance when statistical power has been reduced[36] .

The second likely source of discrepancies between the two chapters relates to the dependent variable of interest. Chapter 3 examined a binary outcome – low school readiness – while this chapter examines group differences along continuous ability scales. One example of how this might lead to different patterns of significant results

[35] A future analysis will test whether the sample size difference between Chapter 3 and 4 analyses causes these differences by employing multiple imputation to replace missing data in the Chapter 4 dataset, then re-estimating the Chapter 4 models.

[36] For example, the present chapter does not find that Puerto Rican children of Puerto Rico-born mothers differ from non-Hispanic white children of native-born mothers in initial reading ability, while Chapter 3 found that they had substantially greater odds of literacy unreadiness. The Chapter 3 dataset included 58 Puerto Rican children of foreign-born mothers; the dataset analyzed in the present chapter includes 20.

can be observed in the Asian/white comparisons. Chapter 3 found that Asian and non-Hispanic white students did not demonstrate significantly different odds of unreadiness in reading, yet the mixed-effects model indicates that Asian students have significantly higher levels of initial reading ability than non-Hispanic white students. This apparent contradiction has a straightforward explanation: both groups have comparatively high average literacy scores and correspondingly low (and statistically equivalent) odds of unreadiness. However, while neither group is very likely to fall into the bottom 20% of test scores, the average scores of Asian students are even further out on the right-hand side of the distribution than the scores of non-Hispanic white students – a difference that is obscured in regressions of the binary “low readiness” outcome on children’s race/ethnicity but is picked up when the outcome is a continuous ability measure. The intercept parameters of the mixed-effects models presented in the present chapter should therefore not be confused with the binary outcomes of Chapter 3’s random-effects logit models; they are distinct measures of early academic status.

In addition to the inter-group differences in initial reading and mathematics ability discussed above, Tables 4.3 and 4.4 present tests of intra-group ability differences, which compare the initial ability levels of children of foreign-born and native-born mothers from the same racial/ethnic or national origin group. Statistically significant (p<.05) within-group generational status differences in initial ability, which are identified by italicized ‘initial status’ coefficients in the tables, exist among non-Hispanic black, Mexican, other Hispanic, and Asian children for both reading and mathematics ability at school entry.

The Hispanic groups that demonstrate generational status differences (Mexican and other Hispanic children) demonstrate a foreign-born disadvantage in initial reading and mathematics ability: those children whose mothers were not immigrants begin school with higher levels of reading and mathematics ability than co-ethnic children whose mothers were born outside the U.S., although both are disadvantaged relative to non-Hispanic white children of native-born mothers.

Non-Hispanic black and Asian children, on the other hand, demonstrate the opposite pattern in initial reading ability: the children of immigrant mothers begin school with significantly higher levels of reading and mathematics ability than children of native-born mothers. A key difference between the Asian and black cases, however, is that the native-born reading ability disadvantage for Asians really amounts to a smaller advantage rather than a true disadvantage, assuming that we take non-Hispanic white children to be the relevant reference group. Among non-Hispanic black children, those with foreign-born mothers arrive at school with equivalent levels of reading ability to non-Hispanic white children of native-born mothers, while black children of native-born mothers have significantly lower levels of initial reading ability. In initial mathematics ability, black children again demonstrate a foreign-born advantage, while among Asians it is the children of native-born mothers who exhibit higher ability levels at school entry.

The Model 1 slope parameters reported in Tables 4.3 and 4.4 suggest that many of the groups that demonstrate initial ability disadvantages also experience flatter ability growth trajectories than non-Hispanic white children of U.S.-born mothers. For reading ability, black children of native-born mothers, other Hispanic children of foreign-born mothers, and Mexican children in both generational status categories face the dual disadvantage of beginning school with lower reading ability levels and proceeding to gain test score points at a slower rate. Black children of native-born mothers have an 18 percent lower predicted linear[37] growth rate in reading ability than non-Hispanic white children of native-born mothers; for Mexican children of foreign-born mothers the gap is also 18 percent, for Mexican children of native-born mothers it is 5 percent, for other Hispanic children of foreign-born mothers the ability growth gap is 7 percent per semester of schooling.

In addition to these doubly disadvantaged groups, black children of foreign-born mothers gain reading ability at a 12 percent lower rate, and other Hispanic children of native-born mothers at an 8 percent lower rate than non-Hispanic white children of U.S.-born mothers despite having statistically equivalent levels of reading ability at school entry. In other words, children from these groups arrive at school with predicted reading abilities that are statistically indistinguishable from those of non-Hispanic white students, yet once school begins, they perform more similarly to their disadvantaged co-ethnic counterparts (native-born blacks and first/second generation Hispanics). While far from conclusive, this evidence is at least suggestive of the notion that schooling does not work as well for children who are identifiable as members of an ethnic or racial minority group.

[37] Relative growth rates are calculated using the linear growth component alone for simplicity's sake; groups with negative linear growth coefficients and significant, positive quadratic growth coefficients reach peak ability less quickly, meaning they experience progressively narrowing ability growth rate gaps over time.

The mathematics ability growth coefficients reported in Table 4.4 resemble those of the reading ability model presented in Table 4.3. Black children of native-born mothers and Mexican and other Hispanic children in both generational status categories experience both lower initial mathematics ability and slower ability growth. Black children of U.S.-born mothers have 23 percent lower linear growth rates than non-Hispanic white children of native-born mothers; among Mexican children the mathematics ability growth gaps are 13 percent for those with foreign-born mothers and 4 percent for those with native-born mothers; among other Hispanic children the gaps are 6 percent for children of foreign-born mothers and 7 percent for those with native-born mothers. Black children of foreign-born mothers demonstrate the same pattern of initial ability and ability growth for mathematics as for reading; that is, these children enter school with comparable mathematics ability levels to non-Hispanic white children, but then gain 12 percent less mathematics ability per semester once schooling begins.

It is instructive to compare the effect sizes (relative to non-Hispanic white children of native-born mothers) of the intercept and slope coefficients within racial/ethnic/national origin and generational status categories. Among Hispanic and Asian children, a general pattern exists in which initial ability gaps, when present, correspond to less dramatic or non-significant gaps in K-8 ability growth. Ability growth during the pre-school years, it would appear, is more unequal along racial/ethnic and national origin lines than ability growth once children enter school. While schooling does not result in equal mathematics and reading ability growth in all children, those from initially disadvantaged groups do tend to experience a narrower gap in reading growth than the ability gap facing them when their schooling careers began.

Foreign-born/native-born mother differences in growth rate are indicated by italicized coefficients in Tables 4.3 and 4.4. The nearly complete absence of such differences, however, is noteworthy. Despite possessing ability levels that are often quite different at school entry, children from the same ethnic/national origin backgrounds tend to gain reading and mathematics ability at the same rate from kindergarten through eighth grade regardless of their mothers' nativity. While initial *between-group* ability gaps frequently correspond to *between-group* differences in ability growth rate between non-Hispanic white and racial/ethnic minority children, *within-group* differences in academic ability at kindergarten entry generally do not lead to unequal growth trajectories between co-ethnic children of foreign- and native-born mothers. The exception to this pattern is found among Mexican children, for whom having an immigrant mother provides a greater disadvantage in predicted reading and mathematics ability growth per semester of schooling. On the whole, however, the evidence suggests that schooling effects tend to be blind to generational status, if not to race/ethnicity.

Adding Measures of Family and School/Community Context to the Race/Ethnicity and National Origin Model

Model 2 in Tables 4.3 and 4.4 adds measures of family SES and child's gender to the intercept and slope submodels. The SES coefficients behave as education researchers have come to expect: a one standard deviation increase in family SES is associated with a 9 percent increase (relative to the model intercept) in initial reading ability and an 11 percent increase in initial mathematics ability, as well as a 7 percent increase in the amount of reading and mathematics ability gained per semester of schooling.

Boys begin school with 5 percent lower levels of reading ability than girls and gain 3 percent less reading ability per semester once schooling begins. Boys and girls do not differ in initial mathematics ability. However, boys gain 7 percent more mathematics ability per semester of schooling than girls.

The effects of these demographic variables are, in an important way, similar to those of the previously estimated race/ethnicity, national origin, and generational status variables. In general, the inequalities children bring with them to kindergarten are partially mitigated once schooling begins. Lower-SES children face both a school readiness and in-school ability growth disadvantage, but the in-school disadvantage is comparatively smaller than the initial ability gap. Similarly, boys begin school at a disadvantage in terms of reading ability, and while some amount of inequality carries over into K-8 reading ability growth, this gap is smaller than the gap at kindergarten entry.

An exception to this pattern of comparatively smaller in-school growth rate inequalities, however, can be observed in gender coefficients for mathematics ability. In a similar situation to that of non-Hispanic black children of foreign-born mothers described above, girls do not arrive at school with lower levels of mathematics ability, yet once schooling begins, girls begin falling behind. Just as schooling does not appear to confer ability gains as rapidly upon black children – even those who demonstrate equivalent levels of initial ability – schooling seems to be less effective in developing girls' mathematics ability than boys', in spite of their equivalent ability levels before schooling begins.

The inclusion of gender and SES measures in Model 2 changes the relationships between race/ethnicity, national origin, generational status, and academic ability growth. It is a relatively safe assumption that, given the random distribution of boys and girls across all groups in the study, family SES is the primary mediator. Unsurprisingly, controlling for family SES tends to reduce the degree of predicted reading and mathematics ability disadvantage experienced by minority children. For black children of foreign-born mothers, the negative slope coefficient for reading is reduced by 27 percent and becomes marginally significant ($p = 0.51$), while the mathematics ability slope coefficient is reduced by 12 percent. The initial ability disadvantage for black children of native-born mothers is not statistically significant for reading ability, and is reduced by 40 percent for mathematics ability. Likewise, non-Hispanic black children's ability growth disadvantages relative to non-Hispanic whites are reduced by 28 percent in reading and 20 percent for math.

Mexican children of foreign-born mothers have 39 percent narrower gaps from third-plus generation non-Hispanic whites in initial reading and mathematics ability as well as a 48 percent narrower gap in reading ability growth and a 62 percent narrower gap in mathematics ability growth after family SES has been added to the model. Mexican children with native-born mothers see their initial reading ability disadvantage and both their reading and mathematics ability growth disadvantages reduced to statistical non-significance by family SES. In addition, their initial disadvantage in mathematics ability is reduced by 38 percent, although it remains statistically significant.

Relative to non-Hispanic white children of native-born mothers, the initial mathematics ability gap for Puerto Rican children whose mothers were born in Puerto Rico is reduced by 13 percent. For Puerto Rican children with mothers who were born one of the 50 states, the initial reading ability gap is reduced by 40 percent, while the initial gap in mathematics ability is reduced by 33 percent.

The initial mathematics ability gap from non-Hispanic whites for Cuban children with foreign born mothers is 21 percent narrower, while the native-born mother advantage in initial mathematics ability among Cuban children is rendered non-significant by family SES. Among other Hispanic children of foreign-born mothers, initial disadvantage is reduced by 41 percent in reading ability and 34 percent in mathematics ability, while growth rate inequality is non-significant in both domains. Other Hispanic children of native-born mothers have a 26 percent narrower gap in initial mathematics ability and ability growth rate gaps that are 12 percent narrower for reading and 18 percent narrower for math. Lastly, the Asian advantage in initial reading ability is reduced to non-significance for the children of native-born mothers, and reduced by 26 percent for children of foreign-born mothers, though it remains statistically significant.

In addition to mitigating minority-white gaps in reading and mathematics ability, family SES reduces within-group generational status gaps non-significant for black children in reading and mathematics ability. However, statistically significant intra-group inequality persists among Mexican children in initial reading and mathematics ability, but not in ability growth rate, other Hispanic children in initial reading and mathematics ability, and Asian children in initial reading and mathematics ability.

Model 3 in Tables 4.3 and 4.4 adds the measure of minority immigrant concentration. It contributes to the model of reading ability growth, but not the model of mathematics ability growth. A one-standard deviation increase in community minority immigrant concentration is associated with a 2 percent increase in initial reading ability. The effect on reading ability growth rate is equivalent to zero.

In comparison to the other effects included in these models, immigrant concentration has a modest effect, and only in reading ability. Nevertheless, the positive intercept coefficient suggests that an immigrant enclave context may prove protective for children's early language development, as residence in a community with a high concentration of immigrant families is associated with higher initial reading ability. The absence of a statistically significant slope coefficient for immigrant enclave in either domain, however, suggests that schooling is no more or less beneficial in terms of children's reading and mathematics ability in an immigrant enclave community than a community with low a level of immigrant concentration.

The fourth and final models presented in Tables 4.3 and 4.4 add two measures of school context: the proportion of the student body eligible to receive free or reduced-price school lunches, and the proportion of the student body that is identified as something other than non-Hispanic white. These variables are scored on a 0 to 100 scale. So, for example, a student who attends a school with an 80 percent minority student body is predicted by Model 4 to enter kindergarten with 0.80 fewer mathematics ability points than an identical student in an otherwise identical school with zero minority students. Aside from this significant intercept coefficient for school minority enrolment in Table 4.4, these school context measures are not significantly related to reading or mathematics ability growth.

The addition of school/community context variables in Models 3 and 4 has little influence on the overall pattern of racial/ethnic, national origin, and generational status differences in K-8 reading and mathematics ability growth observed in Model 2. Broader social context, at least to the extent it is measured in the present study, contributes considerably less explanatory power to models examining differences in children's academic ability growth than family socioeconomic background or the other unmeasured correlates of racial/ethnic and national origin group affiliation.

Despite controlling for relatively few contextual variables, the mixed-effects models presented in Tables 4.3 and 4.4 are able to account for a substantial amount of population heterogeneity, particularly in initial reading and mathematics ability. Tables A.2 and A.3 in the Appendix present the random effects components of these models. While substantial heterogeneity exists at each level for the intercept and growth parameters in the 'complete' model (Model 4), the Pseudo-R^2 values indicate that, for reading ability, 83 percent of between-child and 87 percent of between-school/community variance in initial ability is accounted for by the model. For mathematics ability, the Pseudo-R^2 values are only slightly lower: 82 percent for between-child variance and 84 percent for between-school/community variance. The model is less comprehensive in accounting for population variance in K-8 ability growth, however. For reading ability, Model 4 explains 50 percent of within-child variance in ability growth, 27 and 33 percent of between-child variance in linear and quadratic growth, respectively, and 47 and 0 percent[38] of between-school variance in linear and quadratic growth, respectively.

For mathematics ability, Model 4 explains 45 percent of within-child variance in ability growth, 30 and 20 percent of between-child variance in linear and quadratic growth, respectively, and 54 and 67 percent of between-school variance in linear and quadratic growth, respectively. Thus, some 70 percent of between-child variance and 50 percent of between school/community variance in reading and mathematics ability growth from kindergarten through eighth grade remain to be explained by future research using more extensive covariate arrays.

Figures 4.1 through 4.5 present adjusted growth trajectories for reading ability based on the findings from Model 4 in Table 4.3. The figures display fitted trajectories for groups with significantly different intercept and/or slope coefficients from those of non-Hispanic white children of native-born parents in Model 4. Therefore, for example, Figure 4.5, which displays fitted trajectories for Asian children, only includes a curve for Asian children of foreign-born mothers, as Asian children of native-born mothers have

[38] The level-3 random effect associated with quadratic growth, while statistically significant, is of negligible magnitude in both the reading and mathematics models. Since there is only a miniscule amount of population variance in this parameter to be explained in the first place, there is essentially no difference between the mathematics model's Pseudo-R^2 value of 0.67 and the reading model's 0.00.

an equivalent conditional reading growth trajectory to that of non-Hispanic white children of native-born mothers.

[FIGURES 4.1 – 4.5 HERE]

An examination of Figures 4.1 through 4.5 underscores the extent to which non-Hispanic black children of both generational statuses and, to a lesser extent, Mexican children of foreign-born mothers are disadvantaged relative to non-Hispanic white children, even after statistical models are adjusted for confounders. The reading ability gap from non-Hispanic white children widens over the K-8 period to a much greater extent for non-Hispanic black children than others. By contrast, only a narrow minority/white gap exists over the K-8 period for Puerto Rican, Other Hispanic, and Asian children, when such a gap is present at all.

Figures 4.6 through 4.12 present adjusted growth trajectories for mathematics ability based on the findings from Model 4 in Table 4.4. These figures are presented in the same way as Figures 4.1 through 4.5; they display fitted mathematics ability trajectories for groups with significantly different intercept and/or slope coefficients from those of non-Hispanic white children of native-born parents.

[FIGURES 4.6 – 4.12 HERE]

As with reading ability growth, it is immediately evident upon viewing Figures 4.6 through 4.12 that the minority/white gaps in mathematics ability growth are more pronounced among non-Hispanic black children than children from other racial/ethnic backgrounds. While visually detectable ability gaps develop between non-Hispanic white children and those from Hispanic backgrounds, non-Hispanic black students’ over-time disadvantage is decidedly more conspicuous.

Summary

The basic mixed-effects models of K-8 reading and mathematics ability growth suggest that ability in both domains follows a nonlinear trajectory over time, with growth occurring most rapidly during the early years of schooling and leveling off after approximately fourteen semesters of schooling (when children are typically finishing the sixth grade).

The “benchmark-setting" model for variance partitioning (Model 1 in Table 4.2) indicates that individual reading and mathematics ability growth varies at three levels: within-child, between-child, and between-school/community. For reading ability, approximately 34 percent of the total variance resides within individuals (the dispersion of observed ability scores around each child’s “true” ability trajectory), 51 percent resides between children and within schools, and 16 percent resides between schools. The breakdown for variance in mathematics ability growth is similar: 29 percent at the within-child level, 56 percent at the between-child level, and 15 percent at the between-school level. This particular pattern of variance partitioning is familiar to sociology of education scholars. The conclusion that the amount of inequality in ability or achievement within a given school vastly outweighs the amount of inequality between any two given schools has been a hallmark of the field since the publication of the Coleman Report (1966).

Disaggregating reading ability growth by race/ethnicity, national origin, and generational status reveals substantial between- and within-group differences. In terms of initial reading ability, non-Hispanic black and Puerto Rican children of native-born mothers, other Hispanic children of foreign-born mothers, and Mexican and Asian children in both generational status categories demonstrate significantly different levels of initial reading ability compared to non-Hispanic white children of native-born mothers. For Asian children, this difference is positive, while other groups have lower levels of initial reading ability than non-Hispanic whites.

Certain groups that demonstrate reading ability gaps compared to non-Hispanic white children of native-born mothers at school entry also experience gaps in reading ability growth rate once schooling begins, including non-Hispanic black children of native-born mothers and Mexican children in both generational status categories. In addition, black children of foreign-born mothers and other Hispanic children of native-born mothers have lower predicted rates of reading ability growth than non-Hispanic white children, though their initial ability levels are equivalent.

To the extent that the members of the same racial/ethnic and national origin groups differ in reading ability by generational status, this inequality lies primarily in initial ability. Non-Hispanic black, Mexican, other Hispanic, and Asian children demonstrate significant generational status differences in initial reading ability. The children of foreign-born mothers face a disadvantage among Mexican and other Hispanic children, while they possess higher initial reading ability scores among black and Asian children.

Schooling generally does not exacerbate within-group generational status inequalities in reading ability evident at school entry, however. Mexican children are the only ones for whom generational status is associated with significantly different intra-group differences in reading ability growth, as Mexican children of foreign-born mothers gain reading ability more slowly than children of native-born mothers. For all other groups, generational status is not associated with significantly different rates of reading ability growth.

In terms of mathematics ability, non-Hispanic black children of native-born mothers and Mexican, Puerto Rican, Cuban, and Other Hispanic children of both generational status types demonstrate significant gaps in initial mathematics ability relative to non-Hispanic white children of native-born mothers. Except for Cuban children of native-born mothers, who have higher levels of initial mathematics ability than non-Hispanic white children of native-born mothers, these differences represent disadvantages in initial ability.

Of the groups that begin school with lower initial mathematics ability levels, non-Hispanic black children of foreign-born mothers and Mexican and other Hispanic children in both generational status categories also have slower rates of mathematics ability growth than non-Hispanic white children of native-born mothers once schooling begins. As with reading ability, non-Hispanic black children of foreign-born mothers also experience flatter learning trajectories in mathematics than non-Hispanic white children despite entering school with equivalent ability levels.

Within-group generational status inequalities in mathematics ability exist in terms of initial status among non-Hispanic black, Mexican, other Hispanic, and Asian children. Among non-Hispanic black children, this difference manifests as a foreign-born advantage, while for the other groups native-born children possess the advantage in initial mathematics ability.

As is the case with reading ability, schooling tends not to replicate initial within-group inequalities in mathematics ability. Only Mexican children exhibit a generational status gap in mathematics ability growth, as the children of foreign-born mothers gain mathematics ability more slowly than children of native-born mothers over the kindergarten through eighth grade period.

The addition of child and family context controls in the form of socioeconomic status and gender measures as well as, but to a lesser extent, school/community context measures in the form of immigrant concentration and school percent minority and low-income enrollments explains much of the between- and within-group inequality in reading and mathematics ability growth. Figures 4.1 through 4.12 illustrate the fact that, with these background factors controlled, most groups demonstrate very similar reading and mathematics ability trajectories even if there are statistically significant differences between some of these groups.

Two major exceptions to this pattern exist, however. Mexican children of foreign-born mothers and black children in both generational status categories lose proportionately more ground in reading and mathematics ability to non-Hispanic white children during the K-8 period than members of other groups. For Mexican children of foreign-born mothers and black children of native-born mothers, initial inequalities in reading and mathematics ability grow during the school years. Black children of foreign-born mothers, however, begin school with comparable levels of reading and mathematics ability to non-Hispanic white children, and only begin to fall behind once formal schooling commences.

The present study tells us that the story of academic inequality, net of the factors included in the mixed-effects models of K-8 reading and mathematics ability growth, is not so much one of children of native-born mothers versus children of immigrants or white versus minority children. Rather, inequality in K-8 ability growth among American children who entered kindergarten in 1998 is largely concentrated among three groups: non-Hispanic black children and, to a somewhat lesser extent, Mexican children of foreign-born mothers and other Hispanic children of native-born mothers. Net of family SES and school/community demographic factors, schooling appears to promote fairly equal rates of ability development among non-Hispanic white, Puerto Rican, Cuban, and Asian children. Compared to these groups, however, Mexican children of foreign-born mothers, other Hispanic children of native-born mothers, and, especially, black children of U.S.- and foreign-born mothers alike experience different, flatter growth trajectories over the elementary and middle school years.

It is difficult to interpret the meaning of the results for other Hispanic children of native-born mothers, as this pan-ethnic catch-all category includes children from a wide variety of cultural and national backgrounds. The findings for first/second generation Mexican children and non-Hispanic black children are somewhat more easily interpreted. Members of these groups experience educational disadvantages that extend beyond the influence of socioeconomic status. For most racial/ethnic and national origin groups, schooling appears equally effective in promoting mathematics and reading ability growth, net of family and community context. This is not to say, however, that the K-8 years are ameliorative of school readiness inequalities; while their conditional growth rates tend to be statistically equivalent, initially disadvantaged groups do not catch-up to non-Hispanic white or Asian children over the elementary and middle school years.

Mexican immigrant and non-Hispanic black status, on the other hand, is associated with significantly flatter ability growth trajectories, even among black children of foreign-born mothers, who do not demonstrate an ability disadvantage at school entry. Schooling does not appear as effective in promoting reading and mathematics ability development among children from these groups.

Downey et al. (2004) found that the first two years of schooling were remarkably successful in narrowing achievement gaps along socioeconomic lines, and schooling explained a great deal of inequality not associated with SES race/ethnicity. The present study’s findings are in agreement on this front. Furthermore, Downey and colleagues (2004) found that schooling appeared to increase black/white inequality; a finding also replicated in the present study. The present study is distinguished from prior work by its investigation of ability growth inequalities from school entry through the end of middle school – a time period that, until now, has not been examined. In addition, the present study's incorporation of immigrant generational status and national origin background represents a unique contribution.

Limitations and Future Extensions

The present chapter sought to identify and describe inequalities in children's K-8 academic ability trajectories within and between racial/ethnic, national origin, and generational status groups. For many groups, inequalities in initial reading and mathematics ability and the rate of ability growth could be explained via the inclusion of just a few sociodemographic covariates, chief among them family SES. Without question, a more elaborate model could explain more variation in ability growth, and future research aimed at explaining the inter- and intra-group differences that remain above and beyond this present chapter's most elaborate model would do well to incorporate more information about children's family, school, and community contexts.

For the children of immigrants in particular, more finely tuned measures of school and community openness toward minority immigrant incorporation would be useful to include. Information about ESL program availability in schools, social network data from immigrant parents and their neighbors (social capital measures in general are important to include in research on the success of children of immigrants), and the presence of cultural organizations and advocacy groups in the community would all contribute to a richer body of information on the school and community contexts in which children spend their elementary and middle school years. It is always informative to include measures of parental educational attitudes and expectations in studies of young children's academic outcomes as well; immigrant optimism theory suggests this should be a driving force behind foreign-born/native-born differences, particularly among high-achieving immigrant groups such as Asians (Kao and Tienda 1995).

Tables

Table 4.1
Variable Means/Sample Proportions, Standard Deviations, and Minimum/Maximum Values

	M	*SD*	*Min.*	*Max.*
Reading ability				
Kindergarten entry	36.20	10.00	21.07	133.56
Spring 8th Grade	171.46	27.39	85.62	208.90
Mathematics ability				
Kindergarten entry	27.77	9.27	10.51	93.23
Spring 8th Grade	142.72	21.65	66.17	172.20
Race/Ethnicicty, National Origin,				
Non-Hispanic White, NB	0.614	0.487	0	1
Non-Hispanic White, FB	0.045	0.207	0	1
Non-Hispanic Black, NB	0.081	0.273	0	1
Non-Hispanic Black, FB	0.011	0.105	0	1
Mexican, NB	0.035	0.185	0	1
Mexican, FB	0.053	0.224	0	1
Puerto Rican, NB	0.007	0.083	0	1
Puerto Rican, FB	0.003	0.054	0	1
Cuban, NB	0.001	0.036	0	1
Cuban, FB	0.003	0.053	0	1
Other Hispanic, NB	0.029	0.167	0	1
Other Hispanic, FB	0.020	0.139	0	1
Asian, NB	0.008	0.092	0	1
Asian, FB	0.043	0.204	0	1
Child, Family, and Community				
Male	0.50	0.50	0	1
Famly SES	0.13	0.98	-5.97	3.41
Commmunity Immigrant Concentration	0.03	1.01	-3.30	2.36
School Percent Free/Reduced Lunch	42.68	26.34	0	98.98
School Percent Non-white Enrollment	34.69	34.36	0	100
Sample *N* = 7,118				

Note: FB = Foreign-born mother, NB = Native-born Mother

Table 4.2

Unconditional Mixed-Effects Models of K-8th Grade Ability Growth

	Reading Ability		Math Ability	
FIXED-EFFECTS	Model 1	Model 2	Model 1	Model 2
Initial Status				
Intercept	32.65***	33.97***	26.27***	26.93***
	(0.37)	(0.22)	(0.31)	(0.19)
Linear Growth				
Semester	17.18***	17.09***	13.55***	13.38***
	(0.05)	(0.10)	(0.04)	(0.08)
Quadratic Growth				
Semester^2	-0.53***	-0.54***	-0.39***	-0.39***
	(0.003)	(0.01)	(0.003)	(0.01)
VARIANCE COMPONENTS				
Level-1				
Within-Person	185.02***	100.01***	115.85***	58.42***
Level-2				
Intercept	279.00***	64.09***	224.60***	47.56***
Semester	---	12.27***	---	8.79***
Semester^2	---	0.04***	---	0.02***
Corr.:	---	0.70***	---	0.82***
Corr.: Intercept/	---	-0.90***	---	-0.96***
Level-3				
Intercept	87.03***	23.51***	62.26***	18.57***
Semester	---	5.97***	---	3.10***
Semester^2	---	0.03***	---	0.01***

Table 4.2, continued

INTRACLASS CORRELATION COEFFICIENTS				
ICC_i (Level-2)	0.51	---	0.56	---
ICC_k (Level-3)	0.16	---	0.15	---
Pseudo-R^2				
Level-1	---	0.54	---	0.50
Level-2 Intercept	---	0.23	---	0.21
Level-3 Intercept	---	0.27	---	0.30
Deviance Statistic	292072	283726	292072	283726
Model N	7119	7119	7119	7119

***p <.001; Standard errors are between

Note: Deviance Statistics are different at $\alpha = 0.999$

Table 4.3

Fixed-Effects Coefficients from Mixed-Effects Models of K-8 Reading Ability Growth

		Model 1	Model 2	Model 3	Model 4
White	FB				
	Initial Status	-0.16	-0.28	-0.38	-0.37
		(0.93)	(0.83)	(0.83)	(0.83)
	Slope	0.45	0.24	0.24	0.24
		(0.39)	(0.35)	(0.35)	(0.35)
	Slope^2	-0.02	-0.01	-0.01	-0.01
		(0.02)	(0.02)	(0.02)	(0.02)
Black	FB				
	Initial Status	*1.02*	1.33	1.16	1.22
		(2.09)	(1.84)	(1.84)	(1.84)
	Slope	-2.17*	-1.59^	-1.61*	-1.96*
		(0.90)	(0.82)	(0.82)	(0.87)
	Slope^2	0.09	0.06	0.06	0.06
		(0.06)	(0.05)	(0.05)	(0.05)
	NB				
	Initial Status	*-3.06****	-0.63	-0.58	-0.36
		(0.64)	(0.55)	(0.55)	(0.57)
	Slope	-3.23***	-2.31***	-2.31***	-2.34***
		(0.27)	(0.23)	(0.23)	(0.27)
	Slope^2	0.12***	0.08***	0.08***	0.07***
		(0.02)	(0.02)	(0.02)	(0.02)
Mexican	FB				
	Initial Status	*-7.61****	*-4.62****	*-5.10****	*-4.87****
		(0.91)	*(0.82)*	*(0.84)*	*(0.85)*
	Slope	*-3.14****	-1.65***	-1.68***	*-1.51****
		(0.34)	(0.31)	(0.32)	*(0.32)*
	Slope^2	*0.14****	0.08***	0.08***	*0.07***
		(0.02)	(0.02)	(0.02)	*(0.02)*
	NB				
	Initial Status	*-2.46***	*-1.40^*	*-1.62**	*-1.47^*
		(0.86)	*(0.75)*	*(0.75)*	*(0.76)*
	Slope	*-0.96***	-0.46	-0.45	*-0.36*
		(0.35)	(0.32)	(0.32)	*(0.32)*
	Slope^2	*0.03*	0.01	0.01	*0.01*
		(0.02)	(0.02)	(0.02)	*(0.02)*

Table 4.3, continued

Puerto Rican	FB				
	Initial Status	-3.65	-4.35^	-4.60^	-4.66^
		(3.03)	(2.48)	(2.48)	(2.48)
	Slope	0.16	-0.74	-0.73	-0.75
		(1.31)	(1.08)	(1.08)	(1.08)
	Slope^2	-0.02	0.06	0.06	0.06
		(0.08)	(0.07)	(0.07)	(0.07)
	NB				
	Initial Status	-6.00**	-3.62*	-3.81*	-3.80*
		(1.84)	(1.61)	(1.61)	(1.62)
	Slope	-0.11	-0.33	-0.34	-0.30
		(0.22)	(0.69)	(0.69)	(0.69)
	Slope^2	0.07	0.03	0.03	0.03
		(0.05)	(0.04)	(0.04)	(0.04)
Cuban	FB				
	Initial Status	-4.48	-3.72	-3.91	-3.90
		(3.35)	(2.79)	(2.79)	(2.79)
	Slope	0.89	0.77	0.74	0.78
		(1.33)	(1.17)	(1.17)	(1.17)
	Slope^2	-0.08	-0.05	-0.05	-0.05
		(0.08)	(0.07)	(0.07)	(0.07)
	NB				
	Initial Status	3.31	-3.76	-3.68	3.62
		(4.04)	(3.83)	(3.83)	(3.83)
	Slope	-0.98	0.24	0.25	-0.30
		(1.69)	(1.72)	(1.72)	(1.71)
	Slope^2	0.07	0.00	0.03	0.00
		(0.10)	(0.11)	(0.04)	(0.11)
Other Hisp.	FB				
	Initial Status	*-4.50****	*-2.66**	*-3.00***	*-2.94***
		(1.21)	*(1.07)*	*(1.08)*	*(1.08)*
	Slope	-1.17*	-0.44	-0.46	-0.38
		(0.47)	(0.44)	(0.44)	(0.44)
	Slope^2	0.05^	0.02	0.02	0.02
		(0.03)	(0.03)	(0.03)	(0.02)
	NB				
	Initial Status	*-0.90*	*-0.04*	*-0.16*	*-0.09*
		(0.90)	*(0.79)*	*(0.79)*	*(0.79)*
	Slope	-1.37***	-1.08**	-1.09**	-1.05**
		(0.37)	(0.34)	(0.34)	(0.34)
	Slope^2	0.06*	0.05*	0.05*	0.05*
		(0.02)	(0.02)	(0.02)	(0.02)

Table 4.3, continued

Asian	FB				
	Initial Status	*5.48****	*4.04****	*3.75****	*3.84****
		(0.91)	*(0.85)*	*(0.85)*	*(0.86)*
	Slope	-0.57	-0.46	-0.46	-0.39
		(0.38)	(0.36)	(0.36)	(0.36)
	Slope^2	0.02	0.01	0.01	0.01
		(0.08)	(0.02)	(0.02)	(0.02)
	NB				
	Initial Status	*2.93**	*1.34*	*1.21*	*1.28*
		(1.50)	*(1.54)*	*(1.54)*	*(1.54)*
	Slope	0.84	0.35	0.36	0.39
		(0.63)	(0.67)	(0.67)	(0.67)
	Slope^2	-0.05	-0.02	-0.02	-0.02
		(0.04)	(0.04)	(0.04)	(0.04)
SES Z-Score					
	Initial Status	---	3.25***	3.23***	3.17***
		---	(0.16)	(0.16)	(0.16)
	Slope	---	1.29***	1.29***	1.26***
		---	(0.07)	(0.07)	(0.07)
	Slope^2	---	-0.06***	-0.06***	-0.06***
		---	('0.01)	('0.01)	('0.00)
Male					
	Initial Status	---	-1.64***	-1.64***	-1.64***
		---	(0.26)	(0.26)	(0.26)
	Slope	---	-0.56***	-0.56***	-0.56***
		---	(0.11)	(0.11)	(0.11)
	Slope^2	---	0.02**	0.02**	0.02**
		---	(0.01)	(0.01)	(0.01)
Immigrant Enclave					
	Initial Status	---	---	0.58**	0.71**
		---	---	(0.22)	(0.26)
	Slope	---	---	0.01	0.13
		---	---	(0.09)	(0.11)
	Slope^2	---	---	-0.00	-0.01
		---	---	('0.01)	(0.01)

Table 4.3, continued

School Pct. Free/Reduced Price Lunch				
Initial Status	---	---	---	-0.01
	---	---	---	(0.01)
Slope	---	---	---	-0.00
	---	---	---	(0.00)
Slope^2	---	---	---	0.00
	---	---	---	(0.00)
School Pct. Non-White Enrollment				
Initial Status	---	---	---	-0.01
	---	---	---	(0.01)
Slope	---	---	---	-0.01^
	---	---	---	(0.00)
Slope^2	---	---	---	0.00
	---	---	---	(0.00)
Intercept				
Initial Status	34.79***	34.41***	34.43***	35.09***
	(0.24)	(0.26)	(0.26)	(0.39)
Slope	17.69***	17.57***	17.56***	17.85***
	(0.10)	(0.11)	(0.11)	(0.16)
Slope^2	-0.56***	-0.55***	-0.55***	-0.57***
	(0.01)	(0.01)	(0.01)	(0.01)
Model N	7119	7119	7119	7119

Notes: ****p<.001, **p<.01, *p<.05, ^p<.10 (Two-tailed tests)*
FB = Foreign-born mother, NB = Native-born Mother
Italicized coefficients denote significant intraethnic FB/NB differences for a given parameter

Table 4.4

Fixed Effects Coefficients from Mixed-Effects Models of K-8 Math Ability Growth

			Model 1	Model 2	Model 3	Model 4
White	FB					
		Initial Status	-0.62	-1.34	-1.33*	-1.32*
			(0.73)	(0.65)	(0.65)	(0.65)
		Slope	0.52^	0.26	0.24	0.24
			(0.31)	(0.28)	(0.28)	(0.28)
		Slope^2	-0.01	-0.00	0.00	0.00
			(0.02)	(0.02)	(0.02)	(0.02)
Black	FB					
		Initial Status	1.24	1.83	-1.83	-1.77
			(1.64)	(1.43)	(1.43)	(1.43)
		Slope	-1.66*	-1.47*	-1.50*	-1.45*
			(0.74)	(0.67)	(0.67)	(0.67)
		Slope^2	0.08^	0.07^	0.07^	0.07^
			(0.05)	(0.04)	(0.04)	(0.04)
	NB					
		Initial Status	-5.00***	-3.00***	-3.01***	-2.71***
			(0.51)	(0.43)	(0.43)	(0.44)
		Slope	-3.12***	-2.50***	-2.49***	-2.42***
			(0.22)	(0.19)	(0.19)	(0.20)
		Slope^2	0.13***	0.08***	0.11***	0.10***
			(0.01)	(0.02)	(0.01)	(0.01)
Mexican	FB					
		Initial Status	-7.90***	-4.81***	-4.72***	-4.44***
			(0.71)	(0.63)	(0.65)	(0.65)
		Slope	-1.85***	-0.71**	-0.82**	-0.73**
			(0.27)	(0.25)	(0.26)	(0.26)
		Slope^2	0.09***	0.08***	0.04**	0.04*
			(0.02)	(0.02)	(0.02)	(0.02)
	NB					
		Initial Status	-3.24***	-2.04**	-2.01**	-1.83**
			(0.68)	(0.58)	(0.59)	(0.59)
		Slope	-0.58*	-0.31	-0.36	-0.31
			(0.28)	(0.26)	(0.26)	(0.26)
		Slope^2	0.02	0.11***	0.01	0.01
			(0.02)	(0.01)	(0.02)	(0.02)

Table 4.4, continued

Puerto Rican	FB					
		Initial Status	-5.93*	-5.14**	-5.10**	-5.10**
			(2.37)	(1.93)	(1.93)	(1.93)
		Slope	0.51	-0.23	0.27	-0.30
			(1.07)	(0.89)	(0.89)	(0.89)
		$Slope^2$	-0.04	0.01	0.01	0.01
			(0.07)	(0.06)	(0.06)	(0.06)
	NB					
		Initial Status	-5.48***	-3.70**	-3.69**	-3.63**
			(1.44)	(1.26)	(1.26)	(1.27)
		Slope	-0.04	-0.51	-0.55	-0.53
			(0.17)	(0.56)	(0.56)	(0.56)
		$Slope^2$	0.04	0.04	0.04	0.04
			(0.04)	(0.03)	(0.04)	(0.03)
Cuban	FB					
		Initial Status	-6.37*	-5.03*	-5.03*	-4.98*
			(2.65)	(2.18)	(2.18)	(2.18)
		Slope	0.37	0.25	0.20	0.23
			(1.06)	(0.94)	(0.94)	(0.94)
		$Slope^2$	-0.02	-0.01	-0.00	-0.01
			(0.06)	(0.06)	(0.06)	(0.06)
	NB					
		Initial Status	6.74*	3.12	3.10	3.19
			(3.23)	(3.05)	(3.05)	(3.05)
		Slope	0.18	0.10	0.12	0.14
			(1.33)	(1.37)	(1.37)	(1.37)
		$Slope^2$	-0.01	-0.01	-0.01	-0.01
			(0.08)	(0.08)	(0.08)	(0.08)
Other Hisp.	FB					
		Initial Status	*-5.43****	-3.61***	*-3.56****	*-3.46****
			(0.95)	(0.84)	*(0.84)*	*(0.84)*
		Slope	-0.89*	-0.25	-0.34	-0.29
			(0.38)	(0.35)	(0.36)	(0.36)
		$Slope^2$	0.05*	0.02	0.02	0.02
			(0.02)	(0.02)	(0.02)	(0.02)
	NB					
		Initial Status	*-3.66****	-2.70***	*-2.68****	*-2.62****
			(0.71)	(0.62)	*(0.62)*	*(0.62)*
		Slope	-1.00**	-0.82**	-0.84**	-0.82**
			(0.30)	(0.27)	(0.27)	(0.27)
		$Slope^2$	0.05**	0.04*	0.04^	0.04*
			(0.02)	(0.02)	(0.02)	(0.02)

Table 4.4, continued

Asian	FB				
	Initial Status	*-0.26*	*-0.86*	*-0.82*	*-0.67*
		(0.72)	*(0.66)*	*(0.67)*	*(0.67)*
	Slope	0.09	0.31	0.25	0.28
		(0.30)	(0.29)	(0.29)	(0.29)
	Slope^2	0.01	0.00	0.01	0.01
		(0.02)	(0.02)	(0.02)	(0.02)
	NB				
	Initial Status	*0.62*	*-0.53*	*-0.49*	*-0.40*
		(1.18)	*(1.20)*	*(1.20)*	*(1.20)*
	Slope	0.55	0.59	0.56	0.57
		(0.50)	(0.54)	(0.54)	(0.54)
	Slope^2	-0.01	-0.02	-0.01	-0.01
		(0.03)	(0.03)	(0.03)	(0.03)
SES Z-Score					
	Initial Status	---	3.09***	3.09***	3.04***
		---	(0.12)	(0.12)	(0.12)
	Slope	---	0.97***	0.96***	0.95***
		---	(0.05)	(0.05)	(0.05)
	Slope^2	---	-0.04***	-0.04***	-0.04***
		---	('0.00)	('0.00)	(0.00)
Male					
	Initial Status	---	0.14	0.15	0.15
		---	(0.21)	(0.21)	(0.21)
	Slope	---	0.90***	0.90***	0.90***
		---	(0.09)	(0.09)	(0.09)
	Slope^2	---	-0.05***	-0.05***	-0.05***
		---	(0.01)	(0.01)	(0.01)
Immigrant Enclave					
	Initial Status	---	---	-0.08	0.16
		---	---	(0.17)	(0.20)
	Slope	---	---	0.10	0.14
		---	---	(0.07)	(0.09)
	Slope^2	---	---	-0.00	-0.00
		---	---	('0.01)	(0.01)

Table 4.4, continued

School Pct. Free/Reduced Price	---	---	---	-0.01
Initial Status	---	---	---	(0.01)
	---	---	---	-0.00
Slope	---	---	---	(0.00)
	---	---	---	0.00
Slope^2	---	---	---	(0.00)
School Pct. Non-White				
Initial Status	---	---	---	-0.01*
	---	---	---	(0.01)
Slope	---	---	---	-0.00
	---	---	---	(0.00)
Slope^2	---	---	---	0.00
	---	---	---	(0.00)
Intercept				
Initial Status	28.23***	27.13***	27.13***	27.77***
	(0.20)	(0.20)	(0.20)	(0.30)
Slope	13.86***	13.17***	13.17***	13.32***
	(0.08)	(0.09)	(0.09)	(0.16)
Slope^2	-0.41***	-0.38***	-0.38***	-0.38***
	(0.01)	(0.01)	(0.01)	(0.01)
Model N	7119	7119	7119	7119

Notes: ****p<.001, **p<.01, *p<.05, ^p<.10 (Two-tailed tests)*

FB = Foreign-born mother, NB = Native-born Mother

Italicized coefficients denote significant intraethnic FB/NB differences for a given parameter

Figures

Figure 4.1: Non-Hispanic White and Non-Hispanic Black Students' Conditional Reading Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

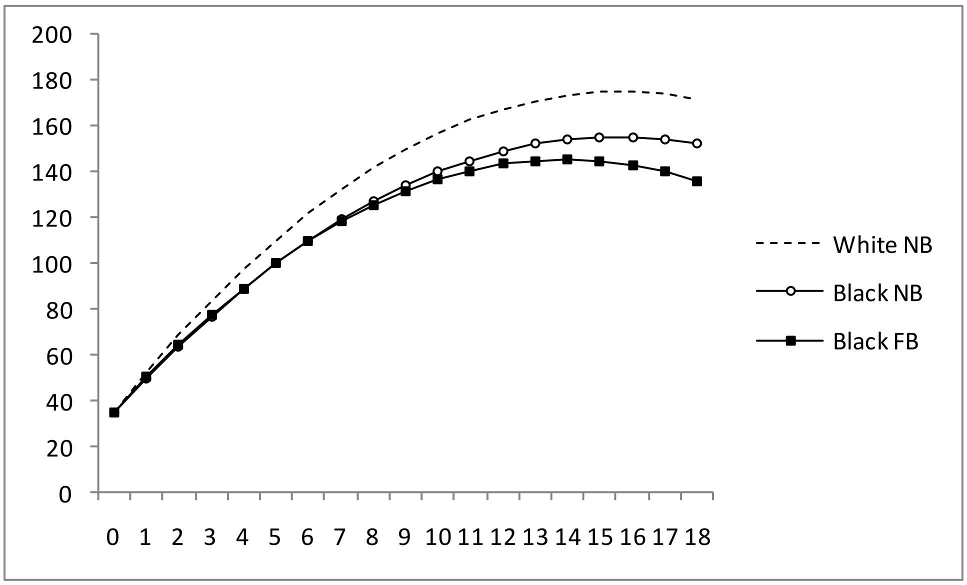


Figure 4.2: Non-Hispanic White and Mexican Students' Conditional Reading Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

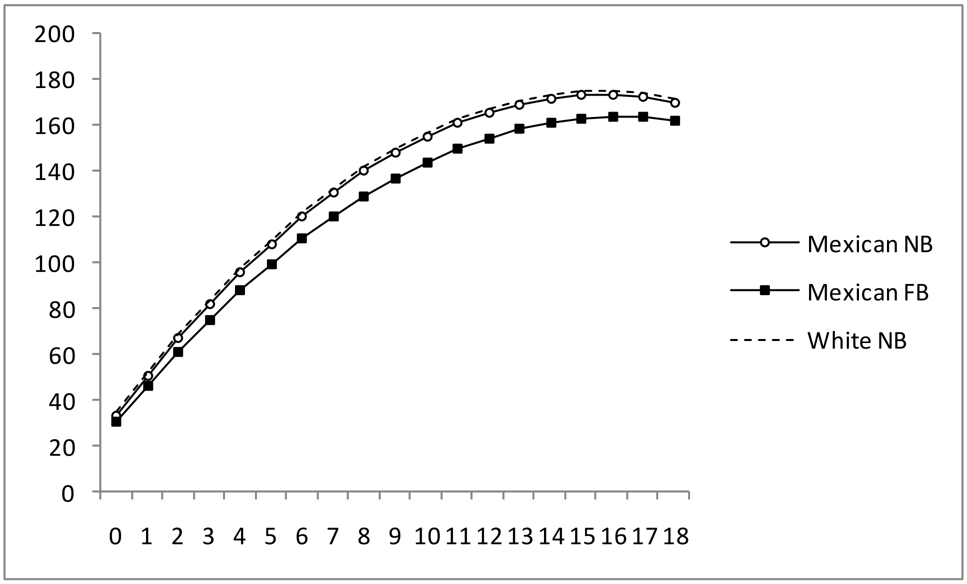


Figure 4.3: Non-Hispanic White and Puerto Rican Students' Conditional Reading Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

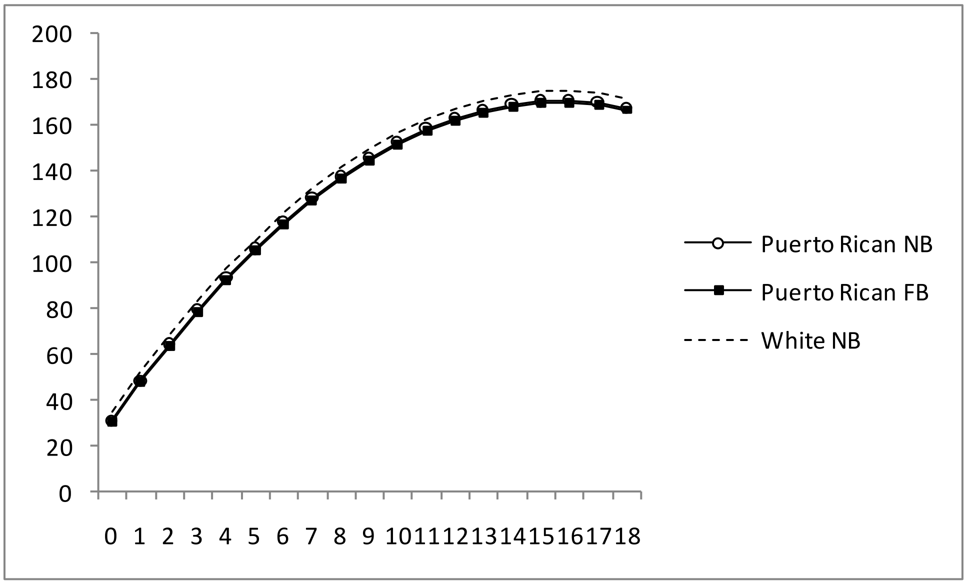


Figure 4.4: Non-Hispanic White and Other Hispanic Students' Conditional Reading Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

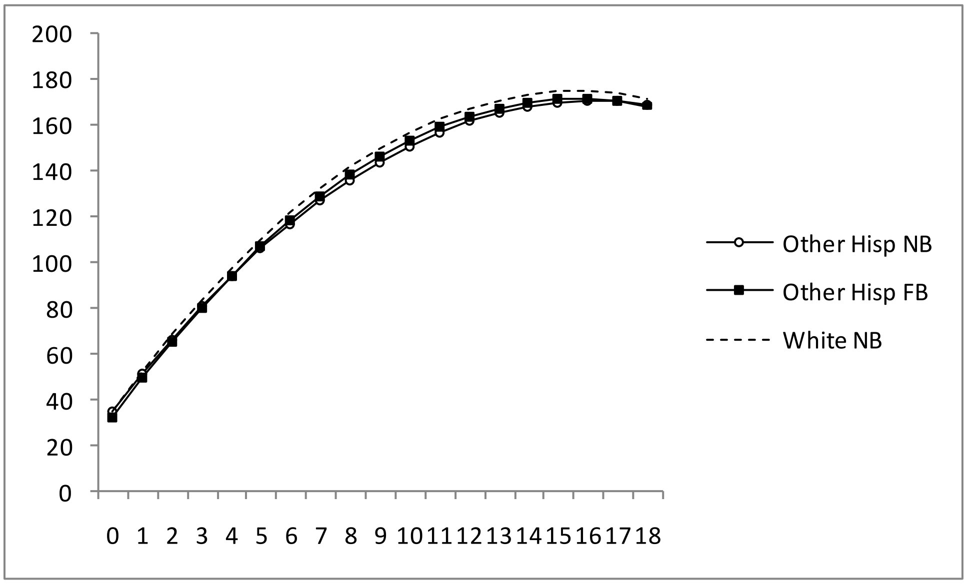


Figure 4.5: Non-Hispanic White and Asian Students' Conditional Reading Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

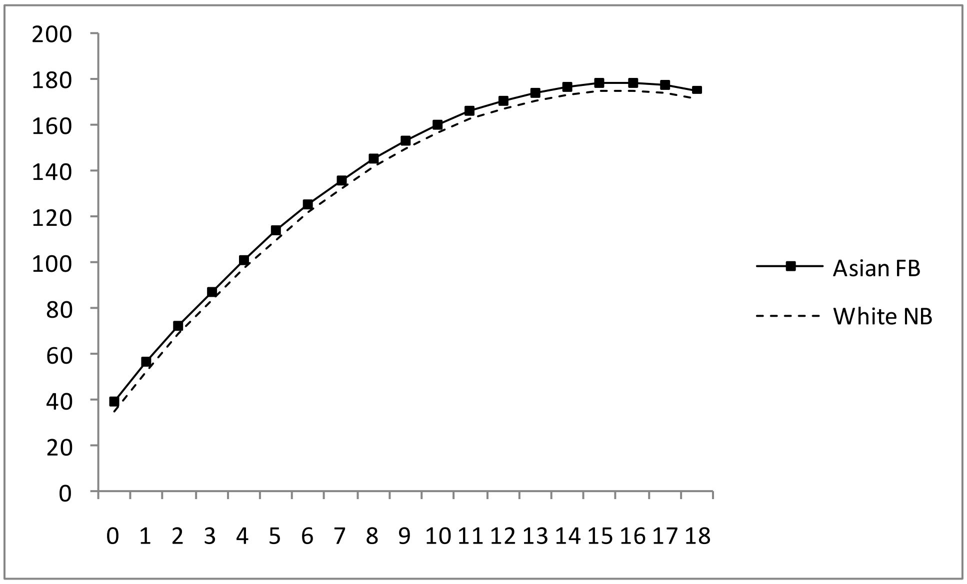


Figure 4.6: Non-Hispanic White and Asian Students' Conditional Reading Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

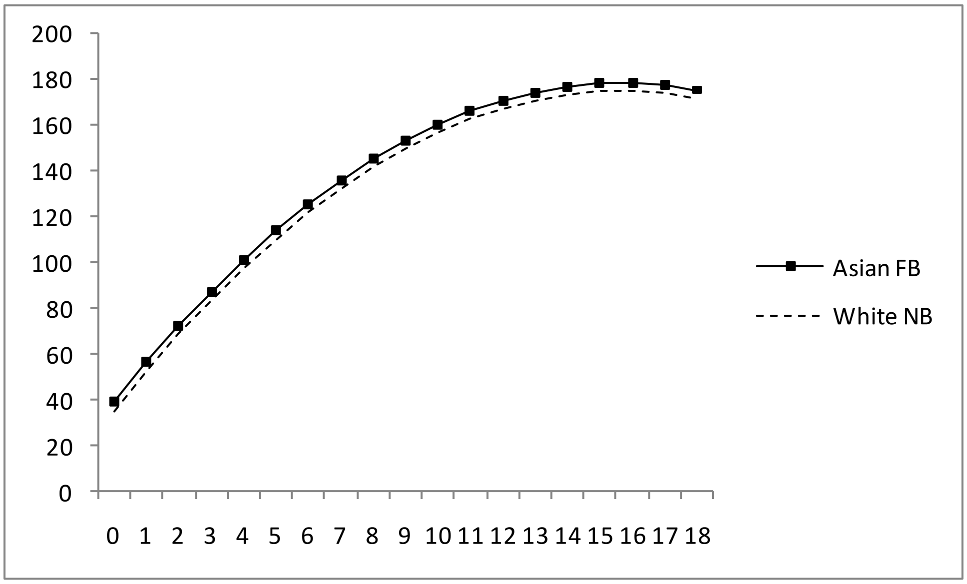


Figure 4.7: Non-Hispanic White Students' Conditional Mathematics Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

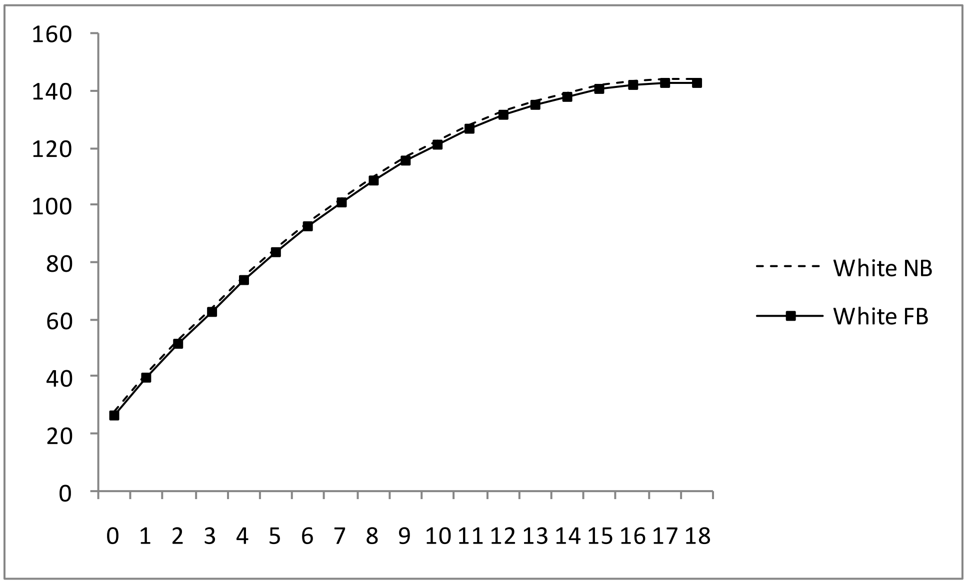


Figure 4.8: Non-Hispanic White and Non-Hispanic Black Students' Conditional Mathematics Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

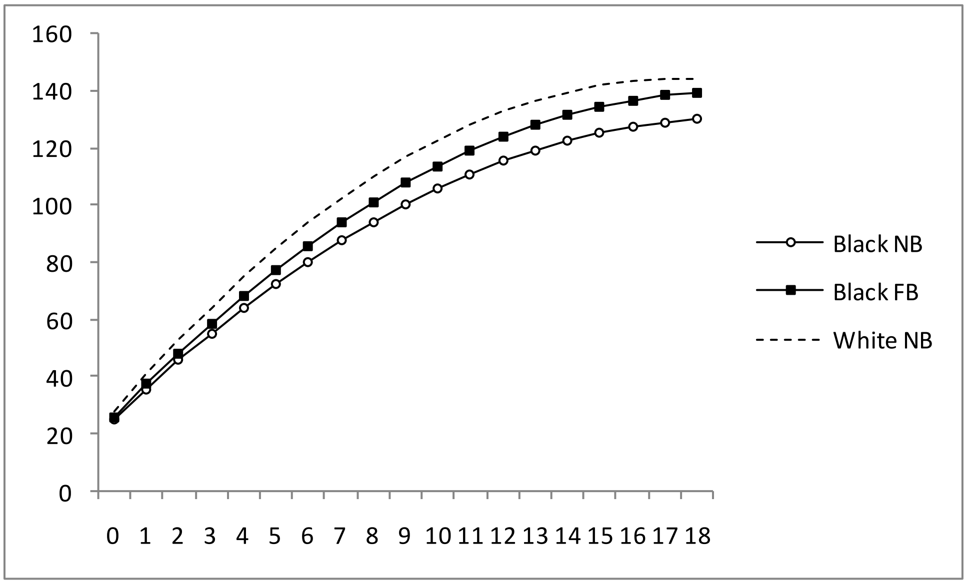


Figure 4.9: Non-Hispanic White and Mexican Students' Conditional Mathematics Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

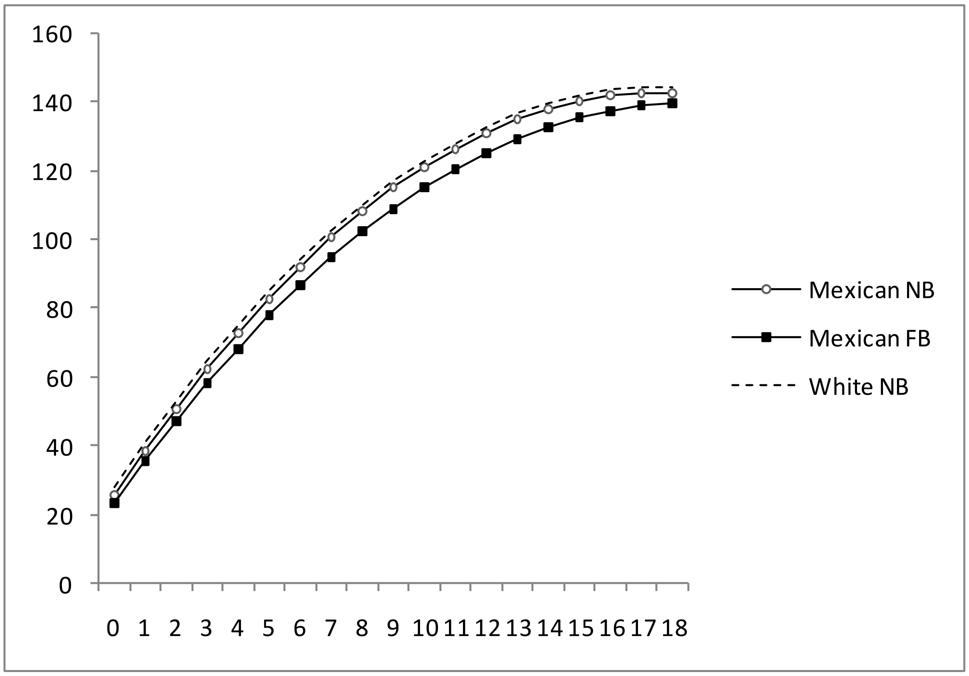


Figure 4.10: Non-Hispanic White and Puerto Rican Students' Conditional Mathematics Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

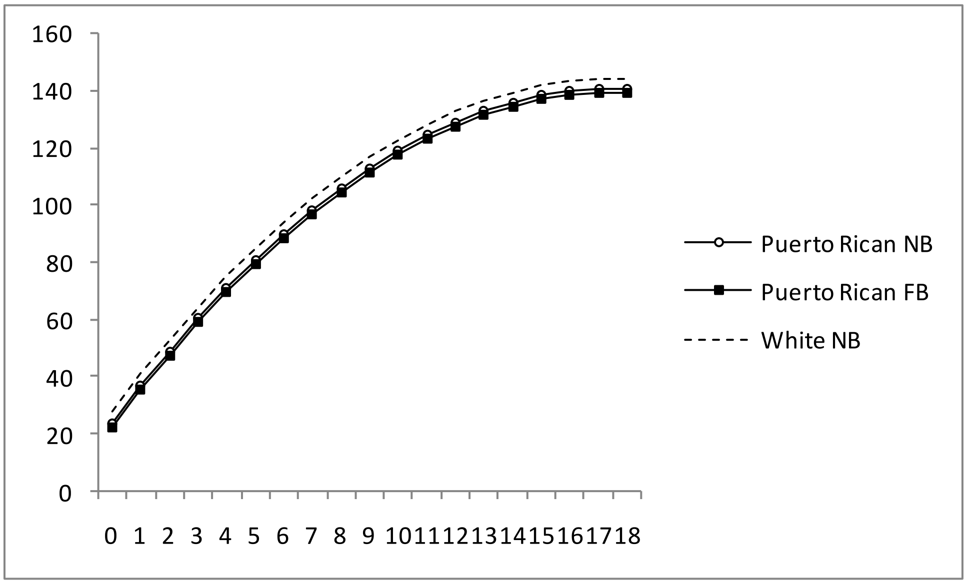


Figure 4.11: Non-Hispanic White and Cuban Students' Conditional Mathematics Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)

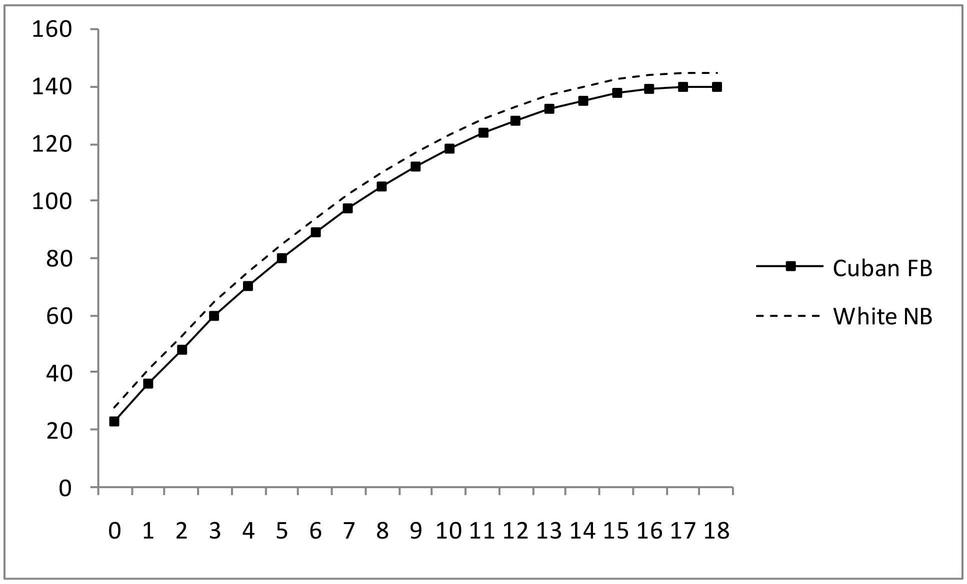
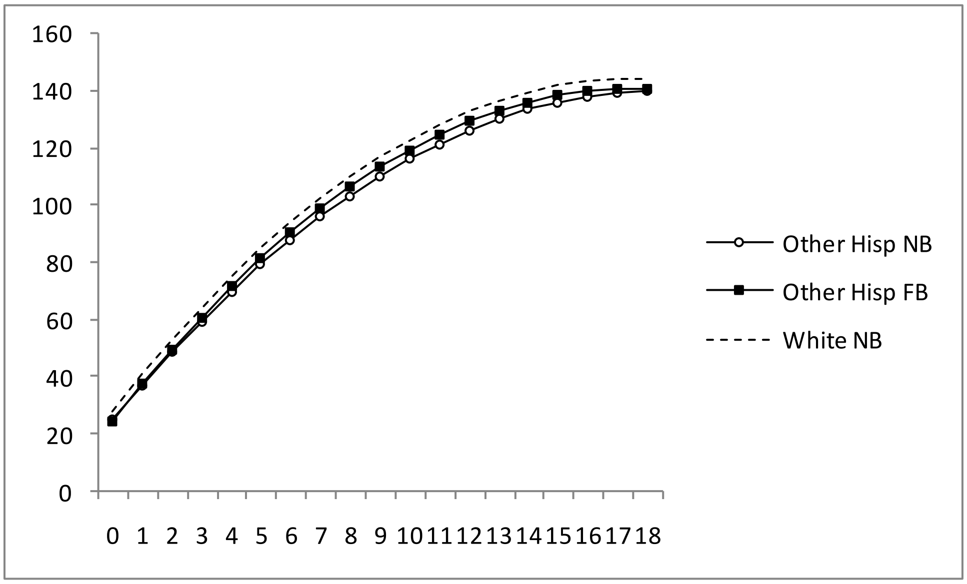


Figure 4.12: Non-Hispanic White and Other Hispanic Students' Conditional Mathematics Ability Score Growth per Semester of Schooling (NB= Children of Native-born Mothers, FB = Children of Foreign-Born Mothers)



CHAPTER 5

Academic Self-Concept at the End of Eighth Grade

Examining the Roles of Generational Status, Race/Ethnicity, Country of Origin, and School/Community Context

Introduction

This final analytic chapter provides a glimpse at adolescents' academic self-perceptions at the time immediately preceding their entry into high school. At this crucial educational juncture, just two years from the age at which compulsory schooling reaches its end, ECLS-K participants were asked to evaluate their own competence in verbal/reading and mathematics school subjects. While the reading and mathematics test scores examined in Chapters 3 and 4 are intended to provide objective evaluations of children's cognitive ability, the self-perceived competence measures analyzed in the present chapter permit an examination of adolescents' perceptions of their own verbal/reading and mathematics ability.

The present chapter examines the following research questions:

(1) How do adolescents' levels of eighth grade verbal/reading and mathematics self-concept vary by race/ethnicity, national origin, and generational status?

(2) To what extent can children's gender, initial academic ability, and family socioeconomic status account for between-child variation in academic self-concept?

(3) Do community immigrant concentration and school racial/ethnic and socioeconomic context influence children's academic self-concept?

Results

Table 5.1 presents variable means/sample proportions, standard deviations, and minimum and maximum values for this sample.

{TABLE 5.1 HERE]

Over two-thirds of the sample is composed non-Hispanic white adolescents with native-born mothers. Non-Hispanic black children of native-born mothers are the next largest group, comprising 10.2 percent of the sample, followed by Mexican children of foreign-born mothers (7.6 percent), non-Hispanic white children of immigrant mothers (7.1 percent), Asian children of foreign-born mothers (5 percent), and Mexican children of native-born mothers (3.8 percent). The remaining groups each make up less than 3 percent of the analytic sample.

Multilevel Regression Models of Verbal/Reading Self-Concept on Adolescent Background and Social Context

Table 5.2 presents the results of two-level regression models of verbal/reading self-concept on adolescents' race/ethnicity, national origin, maternal nativity, gender, kindergarten literacy ability, family SES, and school/community context. As in previous chapters, non-Hispanic white adolescents of native-born mothers serve as the reference category, and asterisks denote significant differences from this group. Significant (*p*<.05, two-tailed) intra-group generational status differences are again represented by italicized coefficients.

[TABLE 5.2 HERE]

Model 1 in Table 5.2 estimates differences in adolescents' eighth grade verbal/reading self-concept within and between racial/ethnic and national origin groups. Mexican children of foreign-born mothers have verbal/reading self-concept scores that are 0.287 points (11 percent[39]) lower than non-Hispanic whites children of native born mothers, while Mexican children of native born mothers' levels are 0.186 points (7 percent) lower. The scores of Asian children of foreign-born mothers are 0.099 (4 percent) higher than those of non-Hispanic white children of native-born mothers. Non-Hispanic black, Puerto Rican, Cuban, and other Hispanic children do not have significantly different verbal/reading self-concept levels from non-Hispanic white

[39] These percentage-difference values are calculated by dividing each group-specific regression coefficient (i.e., the difference in predicted score between that group and non-Hispanic white adolescents with native-born mothers) by the intercept (the predicted score for non-Hispanic white adolescents with native-born mothers).

children of native-born mothers, nor do Asian children of native-born mothers. Generational status differences in verbal/reading self-concept exist among Mexican, Cuban, and Asian children. Among Mexican adolescents, those with foreign-born mothers report lower levels of verbal/reading self-concept, while among Cubans and Asians the children of foreign-born mothers report higher self-concept levels.

Model 2 introduces additional child and family background covariates to the regression model. As hypothesized, family SES is positively associated with verbal-reading self-concept, with a one standard deviation increase in SES being associated with a 0.157 point (6 percent) increase in verbal/reading self-concept. Literacy ability at kindergarten entry is also positively associated with verbal/reading self-concept, with a one standard deviation increase in literacy ability corresponding to a 0.125 point (5 percent) increase in verbal/reading self-concept. Also consistent with prior research, boys have lower levels of verbal/reading self-concept than girls, demonstrating a gender gap of 0.327 points (12 percent).

With the addition of gender, family SES, and academic ability controls in Model 2, the pattern of inter- and intra-group self-concept differences changes substantially. Net of these covariates, non-Hispanic black children have 4 percent higher levels of verbal/reading self-concept than non-Hispanic white children of native-born mothers. Mexican children of native-born mothers are no longer significantly different from non-Hispanic white children, while the gap between Mexican children of foreign-born mothers and non-Hispanic white children of native-born mothers is narrowed from 11 percent to 4 percent, though it remains significant. Cuban children of foreign-born mothers demonstrate 25 percent higher verbal/reading self-concept scores than non-Hispanic whites after the introduction of control variables in Model 2, and other Hispanic children of foreign-born mothers also demonstrate significantly higher self-concept levels (5 percent). The gap between Asian children of foreign-born mothers and non-Hispanic white children of native-born mothers grows from Model 1 to Model 2, from 4 percent to 5 percent.

As in Model 1, Model 2 predicts intra-group generational status differences among Mexican, Cuban, and Asian children, with Mexican children of foreign-born mothers possessing lower and Cuban and Asian children of foreign-born mothers higher levels of verbal/reading self-concept. In addition, Model 2 predicts that Puerto Rican and other Hispanic children of foreign-born mothers have higher verbal/reading self-concepts than their third-plus generation peers.

Model 3 in Table 5.2 adds measures of community immigrant concentration, schools' percentage free and reduced-price lunch eligible enrollments, and school's percentage non-white minority enrollments to the multilevel model. Of these variables, only the proportion of a school's student body identified as non-white is significantly related to children's verbal/reading self-concept. For every 10 percent increase in minority enrollment, children are predicted to experience a .02 point increase in self-concept. This is a rather small effect; the difference in predicted self-concept between an adolescent in a 90 percent minority school and an identical child in a 5 percent minority school is 0.17 points, or approximately 6 percent.

While the school and community context variables included in Model 3 do not have strong direct effects on predicted verbal/reading self-concept net of other covariates, these measures partially mediate several of the minority/non-Hispanic white and within-group generational status differences evident in the results of Model 2. Non-Hispanic black children of native-born mothers no longer differ significantly from non-Hispanic white children of native-born mothers after accounting for measures of social context. Likewise, gaps between non-Hispanic whites and other Hispanic and Asian children of foreign-born mothers are reduced to non-significance in Model 3. The gap between non-Hispanic white children of native-born mothers and Mexican children of foreign-born mothers is also reduced to non-significance. . Model 3 results suggest that Cuban children of native-born mothers possess 23 percent higher self-concept scores than non-Hispanic white children (down from 25 percent in Model 2). Finally, Model 3 predicts that Mexican children of native-born mothers possess 4 percent lower verbal/reading self-concept levels than non-Hispanic white children of native-born mothers.

Multilevel Regression Models of Mathematics Self-Concept on Child Background and Social Context

Table 5.3 presents the results of two-level regression models of eighth grade mathematics self-concept on adolescents' race/ethnicity, national origin, maternal nativity, and confounders.

[TABLE 5.3 HERE]

Model 1 in Table 5.3 establishes patterns of between- and within-group differences in mathematics self-concept. Non-Hispanic white, non-Hispanic black, and Asian children of foreign–born mothers possess higher predicted levels of mathematics self-concept than non-Hispanic white children of native-born mothers. Non-Hispanic white children of foreign-born mothers have 5 percent higher scores, non-Hispanic black children of foreign-born mothers' scores are 12 percent higher, and Asian children of foreign-born mothers' scores are 6 percent higher. Mexican children in both generational status categories have lower levels of mathematics self-concept than non-Hispanic white children of native-born mothers. The gap between Mexican and non-Hispanic white adolescents with native-born mothers is 12 percent for Mexican adolescents with native-born mothers and 9 percent for those with foreign-born mothers.

In addition to the foreign-born/native-born mother mathematics self-concept gap among non-Hispanic white children, within-group inequality exists among non-Hispanic black and Asian children. In each of these groups, adolescents with foreign-born mothers have higher levels of mathematics self-concept than their third-plus generation coethnic peers.

Model 2 adds measures of family SES, kindergarten mathematics ability, and gender to Model 1. As in Model 2 for verbal/reading self-concept, family SES is positively associated with mathematics self-concept, though the magnitude of the association is less than half as large for mathematics self-concept. Kindergarten mathematics ability is also positively related to mathematics self-concept, with a one standard deviation increase in kindergarten mathematics ability score corresponding to a 0.181 point (7 percent) increase in eighth grade mathematics self-concept. Gender displays the hypothesized relationship with mathematics self-concept. Adolescent boys have higher mathematics self-concept scores than girls, net of their demonstrated mathematics ability. The gender gap in mathematics self-concept is much smaller than the gender gap in verbal/reading self concept, however. Boys have 3 percent higher mathematics self-concept scores but 12 percent lower verbal/reading self-concept scores.

The inclusion of additional covariates in Model 2 alters the pattern of results demonstrated in Model 1 to a lesser degree for mathematics self-concept than for verbal/reading self-concept. After controlling for family SES, kindergarten mathematics ability, and gender, non-Hispanic white children of foreign-born mothers continue to demonstrate higher predicted levels of mathematics self-concept than white children of native-born mothers, and the magnitude of the effect is unchanged. Likewise, non-Hispanic black and Asian children of foreign-born mothers continue to demonstrate higher levels of mathematics self-concept than non-Hispanic white children of native-born mothers, though both groups' predicted levels of mathematics self-concept are higher in Model 2 than Model 1. Non-Hispanic black children of native-born mothers, who did not significantly differ from non-Hispanic white children in Model 1, have 6 percent higher predicted mathematics self-concept scores in Model 2.

Patterns of intra-group generational status inequality in mathematics self-concept also remain unchanged between Models 1 and 2. Non-Hispanic white, Non-Hispanic black, and Asian adolescents demonstrate higher predicted mathematics self-concept among the children of foreign-born mothers than among children of U.S.-born mothers.

Model 3 in Table 5.3 includes measures of community immigrant concentration, school percent minority enrollment, and school percent free/reduced price lunch-eligible enrollment. None of these measures is significantly associated with adolescent mathematics self-concept. In addition, the inclusion of these social context measures does not lead to a change in the pattern of minority/non-Hispanic white differences in mathematics self-concept evident in Model 2, nor does the magnitude of these differences change to more than a negligible degree.

Within-group differences in mathematics self-concept remain significant among non-Hispanic white, non-Hispanic black, and Asian adolescents, with children of foreign-born mothers possessing higher scores than their coethnic counterparts with native-born mothers. Results of Model 3 also indicate that Mexican adolescents demonstrate this type of within-group generational status difference in mathematics self-concept.

Discussion

The present study utilized a national sample of adolescents to demonstrate that academic self-concept varies across racial/ethnic, national origin, and generational status groups. While measures of school and community context do not generally contribute much explanatory power to models of academic self-concept variation, measures of child and family background do explain portions of the white/minority and foreign-born/native-born mother gaps in academic self-concept. However, these background factors appear to be more salient for the self-concept formation of adolescents from some groups than others.

Racial/Ethnic and National Origin Variation in Academic Self-Concept

While many findings regarding academic self-concept variation across racial/ethnic and national origin groups emerged from this chapter, a few stand out as particularly important in light of the previous chapters' results, as well as the results of work conducted by other researchers.

The first of these points is that, prior to introducing control variables measuring family and social context, model results indicated that racial/ethnic differences in verbal/reading and mathematics self-concept may be less pronounced than such differences in academic performance. Compared to non-Hispanic white adolescents with native-born mothers, only Mexican adolescents (in both generational status categories) demonstrated significantly lower predicted verbal/reading or mathematics self-concept scores. Asian children of foreign-born mothers, on the other hand, had higher predicted verbal/reading and mathematics self-concepts than non-Hispanic white adolescents with native-born mothers. Despite the fact established in Chapters 3 and 4 that children from black and Hispanic backgrounds tend to demonstrate lower academic test scores than Asians and non-Hispanic whites, adolescents' self-reported academic self-concept scores were generally much less differentiated along racial/ethnic and national origin lines than their achievement scores.

The second notable finding involves the influences of child and family background on immigrant and minority adolescents' academic self-concepts. Controlling for their family SES, reading and math ability at school entry, and gender (each of which was significantly associated with academic self-concept in the hypothesized direction), racial/ethnic minority adolescents tended to demonstrate high levels of academic self-concept, particularly among the children of immigrants.

Net of individual and family background controls, Cuban, other Hispanic, and Asian children of foreign-born mothers and black children of native-born mothers demonstrated significantly higher verbal/reading self-concept than non-Hispanic whites after controlling for individual and family background differences. In terms of their mathematics self-concepts, black adolescents in both generational status categories and Asian adolescents with foreign-born mothers demonstrated higher scores than non-Hispanic white adolescents, controlling for individual and family backgrounds measures. Only Mexican adolescents with immigrant mothers demonstrated significantly lower verbal/reading or mathematics self-concepts than third-plus generation non-Hispanic whites, net of individual and family background controls. The remaining groups' self-concept scores were statistically equivalent to those of non-Hispanic white adolescents with native-born mothers.

Taken together, these results suggest that many minority adolescents hold quite favorable perceptions of their verbal/reading and mathematics abilities, net of their demonstrated performance and family SES. A substantial line of research has examined similarly high academic attitudes among minority students, particularly in terms of the "attitude-achievement paradox" (Downey, Ainsworth, and Qian 2009; Mickelson 1990; Ogbu 1989). This paradox refers to the situation in which minority students (African Americans are by far the most frequently examined group) tend to demonstrate decidedly pro-school attitudes while concurrently demonstrating low average levels of achievement and attainment. One of the most widely cited explanations of this paradox is Steele's (1992) disidentification hypothesis, which suggests that black students "disidentify" with schooling as an important source of self-esteem, in effect discounting the negative feedback received in school (i.e., poor grades, low achievement) in their internal self-concept calculations. In light of this perspective, it is possible that a disidentification could be behind the positive or statistically equivalent coefficients for minority students.

While prior work has examined a different set of attitudes, most of which relate to the students' feelings toward their school and the schooling process in general (e.g., Mickelson 1990), the present study indicates that racial/ethnic minority adolescents generally do not differ from non-Hispanic whites in their perceptions of their own verbal/reading ability. Controlling for family SES and academic performance, results from the present chapter indicate that being a member of a non-white minority group is not generally predictive of poor academic self-concept.

Minority students' high academic self-concepts do not become evident until individual and family background measures are statistically controlled. This finding suggests that individual and family background factors tend to depress minority students' academic self-concepts. However, results indicate that community and school factors may influence adolescents' self-concepts in the opposite direction, serving to promote higher self-concept scores. Of the school and community context measures examined, only school non-white enrollment was significantly related to children's verbal/reading self-concept, and no social context measure was associated with mathematics self-concept. However, the three measures of social context, net of individual and family background, combined to partially explain many of the positive racial/ethnic and national origin associations with verbal/reading self-concept evident in earlier models.

With school and community context measures controlled, only Cuban adolescents with foreign-born mothers continued to demonstrate significantly higher verbal/reading self-concepts than non-Hispanic white children of native-born mothers. This finding suggests that many non-white minority adolescents derive social-psychological benefits from their social and school contexts that serve to boost their verbal/reading self-concept scores. Definitive social context effects did not emerge in the mathematics self-concept domain, however.

Generational Status Variation in Academic Self-Concept

In addition to making between-group, white/minority comparisons, the present chapter examined academic self-concept differences within racial/ethnic and national origin groups associated with adolescents' generational status. Two key findings emerged from this line of inquiry: (1) net of individual and family background measures, adolescents with foreign-born mothers tended to demonstrate equal or higher levels of academic self-concept than their co-ethnic peers with native-born mothers, and (2) for certain race/ethnicity and national origin groups, school and community context measures mediated these within-group differences.

Net of individual and family background measures (but not school or community context measures), Puerto Rican, Cuban, other Hispanic, and Asian adolescents with foreign-born mothers all demonstrated verbal/reading self-concept advantages relative to co-ethnic adolescents with native-born mothers. With respect to mathematics self-concept, non-Hispanic white, non-Hispanic black, Mexican, Puerto Rican, other Hispanic, and Asian adolescents with foreign-born mothers demonstrated higher predicted scores than those with native-born mothers. The only groups demonstrating the opposite pattern – third-plus generation advantage – were Mexicans in the domain of verbal/reading self-concept and Cubans in the domain of mathematics self-concept.

This tendency toward immigrant-mother advantage, net of academic performance and family SES, is in line with the *immigrant optimism* perspective on immigrant children’s academic assimilation (Kao and Tienda 1995). This theoretical perspective has found considerable recent support in studies of the academic performance of the children of immigrants (Leventhal, Xue, and Brooks-Gunn 2006, Pong, Hao, and Gardner 2005). The immigrant optimism perspective suggests that immigrant parents are self-selected, with those who have particularly strong motivations toward upward mobility being most likely to migrate to the United States.

These highly invested parents are optimistic about their children's prospects in the new country, and this parental optimism carries over into high levels academic performance among their children. While, to my knowledge, all extant research examining the immigrant optimism hypothesis has examined academic achievement as the outcome of interest, these results suggest that it may apply to adolescent's non-cognitive academic self-concepts as well. Based on the results of the present chapter, adolescents with immigrant mothers appear to be imbued with a strong positive perception of their own academic ability.

In both domains of self-concept, the inclusion of school and community context measures reduced predicted intra-group generational status gaps among Mexican, Puerto Rican, and other Hispanic adolescents to statistical non-significance. Significant within-group differences persisted among Cuban and Asian adolescents, however. This finding suggests that non-Cuban Hispanic adolescents with immigrant mothers derive self-concept benefits from their social contexts. These adolescents are likely to experience social contexts that are typically considered disadvantageous: high-minority and low-SES schools, and communities with higher concentrations of immigrant residents. Yet, Mexican, Puerto Rican, and other Hispanic adolescents derive academic self-concept benefits from these school and community settings.

Limitations and Future Directions

As in the previous chapters, the paucity of available information in the ECLS-K regarding the national origin group affiliations of many Hispanic and Asian children of U.S.-born mothers necessitates the use of over-simplified, pan-ethnic classifications such as 'other Hispanic' and 'Asian'. It must be assumed that important intra-ethnic variation is glossed over as a result. This limitation can be addressed in future data collection, which should aim to collect as much information as possible regarding individuals' national heritage; particularly those individuals with close temporal ties to immigration.

A second data limitation involves the potential for bias in the present chapter's analyses as a result of non-random sample attrition and differential item-missingness. As is the case with nearly every large-scale longitudinal study, the ECLS-K is affected by respondent attrition over the study period, which has the potential to bias results and impair external validity. However, use of the ECLS-K's child-level probability weights in the present study provides some correction for bias as a result of non-random attrition. Item non-response, which causes over 2,000 cases to be omitted from the present chapter's analytic sample, will be addressed in future analyses by employing multiple imputation of missing values. Multiple imputation involves the creation of multiple complete data sets containing imputed values for missing data, each of which can be analyzed using standard complete-data methods. The estimates garnered from the separate data sets are then combined into one coherent set of findings (Rubin 1977, 1996). Multiple imputation has the advantage over single imputation of incorporating uncertainty into the standard errors of imputed values by accounting for variance between imputed solutions (Acock 2005; Schafer 1999). Because single imputation approaches assume perfect estimation of imputed values and ignore between-imputation variability, single imputation may result in artificially small standard errors and increased likelihood of type-one errors, particularly when the proportion of missing items is high.

Despite theory and prior research suggesting that social context should be a prime determinant of academic self-concept, the present chapter found scant evidence to this effect. One obvious possibility is that the present analyses did not include the relevant measure(s) of social context. In particular, certain research examining contextual effects on children's academic self-concept (e.g., Marsh 1991) has invoked classmates' average achievement level as the operative contextual influence. Future research extending the present chapter will include such a measure.

Parental educational attitudes and expectations represent a second type of contextual measure that is likely related to adolescents' academic self-concepts, particularly among those in the first or second immigrant generation (Kao and Tienda 1995). As perhaps the most significant 'significant others' in a child's world, parents who hold high expectations for their children's academic success are in a unique position to transfer these expectations to their children. To the extent that they are successful in inculcating high educational expectation in their children, parental educational expectations should be positively associated with children's academic self-concept. Alternatively, unreasonably high expectations could have the opposite effect, if a child's continual failure to live up to high parental expectations leads to lower levels of academic self-concept. In either case, parental educational expectations are likely an important variable to consider in a study of children's academic self-concepts, and they are not included in the present study only because such information was not collected as part of the ECLS-K.

An alternative explanation for the present study's lack of evidence in support of clear contextual effects is that community immigrant concentration is an important influence, but that it was not appropriately operationalized in this study. The community immigrant concentration measure examined in Chapters 4 and 5 of the present study does not reflect the ethnic or national origin composition of the immigrant communities in question. The frame-of-reference theory of self-concept construction and cultural discontinuity theory, both of which motivated the present chapter's hypotheses regarding contextual effects, explicitly deal with individuals' relative similarity to others in their social reference group. Instead of using a measure of the percentage of residents in a community who are foreign-born, a better measure of community immigrant concentration in this case might be the percentage of residents in an individual's community who are both foreign born *and members of the same racial/ethnic and national origin group*.

This is a non-trivial distinction. For example, a community composed of 40 percent foreign-born Vietnamese residents may represent an advantageous social and educational context for a Vietnamese child of immigrant parents, while the same child living in a community composed of 40 percent Mexican immigrants might not be expected to experience the same positive educational outcomes. Using the measure employed in the present study, these two hypothetical communities would be indistinguishable. More insight may be gained in future work by using a more finely tuned measure reflecting *co-ethnic* immigrant concentration instead.

Tables

Table 5.1

Variable Means/Sample Proportions, Standard Deviations, and Minimum/Maximum Values

	M	*SD*	*Min.*	*Max.*
Academic Self-Concept				
Verbal/Reading Self-Concept	2.55	0.75	1	4
Mathematics Self-Concept	2.67	0.88	1	4
Race/Ethnicicty, National Origin, and Mother's Nativity				
Non-Hispanic White, NB	0.672	0.470	0	1
Non-Hispanic White, FB	0.071	0.257	0	1
Non-Hispanic Black, NB	0.102	0.303	0	1
Non-Hispanic Black, FB	0.008	0.088	0	1
Mexican, NB	0.038	0.190	0	1
Mexican, FB	0.076	0.265	0	1
Puerto Rican, NB	0.006	0.078	0	1
Puerto Rican, FB	0.002	0.044	0	1
Cuban, NB	0.001	0.024	0	1
Cuban, FB	0.002	0.044	0	1
Other Hispanic, NB	0.029	0.167	0	1
Other Hispanic, FB	0.025	0.156	0	1
Asian, NB	0.022	0.148	0	1
Asian, FB	0.050	0.217	0	1
Child, Family, and Community Background				
Male	0.50	0.50	0	1
Fall-Kindergarten Reading Ability	-0.01	0.99	-3.07	7.24
Fall-Kindergarten Math Ability	-0.01	0.96	-3.56	6.62
Famly SES	-0.05	0.77	-2.62	2.42
Commmunity Immigrant Concentration	-0.08	1.01	-3.54	2.26
School Percent Free/Reduced Lunch	40.40	25.37	0	98.98
School Percent Non-white Enrollment	34.70	34.36	0	100
Sample *N* = 5,045				

Note: FB = Foreign-born mother, NB = Native-born Mother

Source: Early Childhood Longitudinal Study, Kindergarten Class of 1998-99 (ECLS-K)

Table 5.2

Two-Level Regression Models of Verbal/Reading Self-Concept on Race/Ethnicity, National Origin, Mother's Nativity, and Community Immigrant Context

		Model 1	Model 2	Model 3
White				
	FB	0.064	0.061	0.060
		(0.046)	(0.044)	(0.044)
Black				
	NB	-0.001	0.114**	0.040
		(0.036)	(0.035)	(0.040)
	FB	0.034	0.090	0.041
		(0.119)	(0.113)	(0.114)
Mexican				
	NB	-0.186**	-0.074	-0.111*
		(0.056)	(0.053)	(0.055)
	FB	-0.287***	-0.111*	0.061
		(0.044)	(0.047)	(0.053)
Puerto Rican				
	NB	-0.224^	-0.121	-0.137
		(0.134)	(0.127)	(0.127)
	FB	-0.032	0.076	0.046
		(0.235)	(0.222)	(0.222)
Cuban				
	NB	-0.030	-0.213	-0.199
		(0.431)	(0.408)	(0.407)
	FB	0.446^	0.660**	0.605**
		(0.236)	(0.224)	(0.225)
Other Hispanic				
	NB	-0.052	-0.042	-0.046
		(0.064)	(0.060)	(0.061)
	FB	-0.086	0.143*	0.107
		(0.070)	(0.068)	(0.070)
Asian				
	NB	0.095	0.053	0.030
		(0.072)	(0.068)	(0.069)
	FB	0.099*	0.121*	0.091^
		(0.049)	(0.047)	(0.049)
Family SES		---	0.157***	0.172***
		---	(0.015)	(0.016)

Table 5.2, continued

Fall-K Reading Ability	---	0.125***	0.128***
	---	(0.013)	(0.013)
Male	---	-0.327***	-0.326***
	---	(0.020)	(0.020)
Community Immigrant Concentration	---	---	-0.025^
	---	---	(0.014)
School Pct. Free/Reduced Lunch	---	---	0.000
	---	---	(0.001)
School Pct. Minority Enrollment	---	---	0.002**
	---	---	(0.001)
Intercept	2.571***	2.688***	2.637***
	(0.015)	(0.017)	(0.026)
N	5,045	5,045	5,045

*Notes: ***p<.001, **p<.01, *p<.05, ^p<.10 (Two-tailed*
FB = Foreign-born mother, NB = Native-born Mother

Table 5.3

Two-Level Regression Models of Mathematics Self-Concept on Race/Ethnicity, National Origin, Mother's Nativity, and Community Immigrant Context

		Model 1	Model 2	Model 3
White				
	FB	0.121*	0.122*	0.130*
		(0.054)	(0.053)	(0.053)
Black				
	NB	0.010	0.142**	0.136**
		(0.042)	(0.042)	(0.049)
	FB	0.328*	0.394**	0.419**
		(0.141)	(0.138)	(0.140)
Mexican				
	NB	*-0.323****	*-0.232****	-0.209**
		(0.066)	*(0.065)*	(0.067)
	FB	*-0.228****	*-0.011*	0.027
		(0.052)	*(0.054)*	(0.061)
Puerto Rican				
	NB	0.001	*0.072*	0.097
		(0.158)	*(0.155)*	(0.155)
	FB	0.080	*0.265*	0.277
		(0.278)	*(0.272)*	(0.272)
Cuban				
	NB	*0.492*	*0.227*	*0.219*
		(0.511)	*(0.500)*	*(0.499)*
	FB	*0.040*	*0.144*	*0.187*
		(0.279)	*(0.273)*	*(0.275)*
Other Hispanic				
	NB	-0.095	*-0.023*	-0.012
		(0.075)	*(0.074)*	(0.074)
	FB	-0.162^	*0.007*	0.033
		(0.083)	*(0.082)*	(0.085)
Asian				
	NB	*0.012*	*0.015*	*0.026*
		(0.085)	*(0.083)*	*(0.083)*
	FB	*0.171***	*0.273****	*0.292****
		(0.058)	*(0.057)*	*(0.060)*
Family SES		---	0.064***	0.065**
		---	(0.018)	(0.020)

Table 5.3, continued

Fall-K Math Ability	---	0.181***	0.181***
	---	(0.014)	(0.014)
Male	---	0.084***	0.085***
	---	(0.024)	(0.024)
Community Immigrant Concentration	---	---	-0.031^
	---	---	(0.016)
School Pct. Free/Reduced Lunch	---	---	-0.001
	---	---	(0.001)
School Pct. Minority Enrollment	---	---	0.000
	---	---	(0.001)
Intercept	2.684***	2.599***	2.599***
	(0.014)	(0.020)	(0.031)
N	5,045	5,045	5,045

*Notes: ***p<.001, **p<.01, *p<.05, ^p<.10 (Two-tailed*
FB = Foreign-born mother, NB = Native-born Mother

CHAPTER 6

Conclusion

Findings from the present study demonstrate that children's early academic success varies considerably between racial/ethnic and national origin groups as well as within these groups among children of different immigrant generational statuses. Using nationally representative data drawn from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-99, the present study highlights inter- and intra-group inequalities in cognitive and behavioral school readiness, kindergarten through eighth grade literacy and numeracy ability growth, and academic self-concept at the transition to high school. This study goes on to investigate the ways in which social class, family background, and school and community context shape children's early educational outcomes, paying particular attention to the children of immigrants.

Summary of Findings

School Readiness

The present study examined children's likelihood of being unready to begin formal schooling in four domains of academic aptitude: literacy, numeracy, general knowledge, and classroom behavior. Members of non-Asian minority racial/ethnic and national origin groups demonstrate higher likelihoods of cognitive unreadiness than non-Hispanic white children. This disadvantage tends to be magnified among children whose mothers were born outside the mainland-United States; Mexican and Puerto Rican children in particular. The first/second generation minority disadvantage in school readiness with respect to third-plus generation non-Hispanic whites is particularly marked in the general knowledge domain, in which it is evident among all groups except Cubans.

Asian children differ from other non-white minorities, insofar as their likelihood of unreadiness in literacy, approaches to learning, and numeracy is equivalent to that third-plus generation non-Hispanic whites, with Asian children of foreign-born mothers demonstrating significantly lower odds of unreadiness than non-Hispanic whites in the numeracy domain.

Within racial/ethnic and national origin groups, children of foreign-born mothers tend to demonstrate higher odds of unreadiness in literacy, numeracy, and general knowledge, although this pattern does not apply to all groups in all school readiness domains (in particular, the opposite pattern is evident among Asians in literacy and numeracy readiness).

These inter- and intra-group school readiness differentials are explained to a large degree by measures of family economic, human, and cultural capital. Literacy unreadiness differences from non-Hispanic white children are reduced to non-significance among non-Hispanic black children and other Hispanic children of foreign-born mothers upon inclusion of the family background variable array. Literacy unreadiness differences are partially reduced, but remain significant, among Mexican children, Puerto Rican children, and other Hispanic children of foreign-born mothers.

Asian children of foreign-born mothers are predicted to have significantly lower odds of literacy unreadiness than non-Hispanic white children of native-born mothers. Within groups, family background measures reduce the generational status gap among other Hispanic children to non-significance, while significant generational status gaps persist among Mexican, Puerto Rican, and Asian children.

Family background measures reduce minority-white numeracy readiness differentials to non-significance among Puerto Rican and other Hispanic children of native-born mothers. Narrower, though still statistically significant gaps persist between non-Hispanic white children of native-born mothers and non-Hispanic black and Mexican children in both generational status categories, as well as Puerto Rican, other Hispanic, and Asian children (who demonstrate significantly lower likelihoods of unreadiness) of foreign-born mothers. Family background measures are more effective in explaining intra-group generational status differences, however, reducing these differences to non-significance among Mexican, Puerto Rican, and other Hispanic children. A generational status gap in odds of numeracy unreadiness persists among Asians.

Family background measures do not explain nearly as many differences in general knowledge unreadiness as they do in other domains of school readiness. Compared to non-Hispanic white children of native-born mothers, only Puerto Rican children of native-born mothers and non-Hispanic white children of foreign-born mothers have differences reduced to non-significance by the inclusion of family background measures. Within groups, these covariates reduce the generational status gap among Asians to non-significance, but a first/second generation disadvantage persists among non-Hispanic black, Mexican, Puerto Rican, and other Hispanic children.

The findings regarding general knowledge readiness suggest that more diffuse competencies related to children's understanding of the physical and social world around them (as opposed to narrowly defined literacy or numeracy based skills) may be particularly lacking among the children of immigrant mothers. Questions on the general knowledge test assess competencies that should be expected to favor children who are familiar with the United States over children who (along with their parents), are relatively less familiar with American history, government, culture, geography, and economics.

The final domain of school readiness examined in the present study reflects students' socioemotional preparedness to succeed in the classroom environment. This outcome, which is indicated by teacher ratings of children's task-related learning behaviors, varies within and between groups to a far lesser extent than literacy, numeracy, or general knowledge readiness. Non-Hispanic white children of foreign-born mothers, Puerto Rican children of native-born mothers, and non-Hispanic black and Mexican children in both generational status categories are more likely than non-Hispanic white children of native-born mothers to be behaviorally unready for kindergarten. Aside from non-Hispanic whites, no group demonstrates significant foreign-born/native-born mother differences in likelihood of behavioral unreadiness.

Family background accounts for all differences in behavioral unreadiness except one: the higher likelihood of non-Hispanic black students in both generational status categories to be rated by their kindergarten teachers as poorly behaved. While black children's poor behavior ratings have been attributed to racial bias on the part of white teachers (Downey and Pribesh 2004[40]), cultural discontinuity between African American norms and those of American schools may be an alternative explanation. To the extent that American schools enforce behavioral norms associated with 'mainstream white culture', African American cultural repertoires may not mesh with kindergarten teachers' classroom behavior expectations, regardless of teachers' race. This situation is notably different from oppositional culture explanations (e.g., Fordham and Ogbu 1986) of black students lower behavior ratings, as oppositional culture implies an active, oppositional stance toward schooling among black children, while a cultural discontinuity perspective implicates structurally embedded, taken-for-granted assumptions about normative classroom behavior as the source of racial inequalities in student behavior ratings.

Kindergarten through Eighth Grade Reading and Mathematics Ability Growth

In Chapter 4 of the present study, I examined children's growth in reading and mathematics ability from kindergarten entry through the end of eighth grade. The mixed-effects models estimated in Chapter 4 modeled two components of children's ability trajectories: initial status (i.e., model intercept) and rate of change (i.e., model

[40] Examining ECLS-K data, Downey and Pribesh concluded that white teacher bias caused black children's lower externalizing behavior ratings, but did not contribute to black children's lower approaches to learning scores at kindergarten entry (the behavior measure in question in the present study).

slope). In both domains of ability, inequality in initial status tended to exceed inequality in ability growth rate, particularly after measures of socioeconomic background were added to the models.

In terms of reading ability, non-Hispanic black and Puerto Rican children of native-born mothers, other Hispanic children of foreign-born mothers, and Mexican and Asian children in both generational status categories demonstrated significantly different levels of initial reading ability from non-Hispanic white children of native-born mothers. For Asian children, this difference is positive, while other groups exhibited lower levels of initial reading ability than non-Hispanic whites.

The predicted reading ability slopes of non-Hispanic black and Mexican children in both generational status categories and other Hispanic children of native-born mothers are significantly lower than the slopes of non-Hispanic white children of native-born mothers. Interestingly, non-Hispanic black children of foreign-born mothers and other Hispanic children of native-born mothers have lower predicted rates of reading ability growth than non-Hispanic white children despite arriving at school with equivalent reading ability levels.

Children's reading ability trajectories also vary within racial/ethnic and national origin groups along generational status lines. Non-Hispanic black, Mexican, other Hispanic, and Asian children demonstrate significant generational status differences in initial reading ability. The children of foreign-born mothers face a disadvantage among Mexican and other Hispanic children, while they possess higher initial reading ability scores among black and Asian children.

Intra-group inequality in reading ability growth rate is less apparent than inequality in initial status. Only Mexican children differ in reading ability growth rate according to generational status, with children of foreign-born mothers exhibiting flatter growth trajectories than children of native-born mothers. For all other groups, generational status is not associated with significantly different rates of reading ability growth within racial/ethnic and national origin groups.

The addition of family and school/community context measures explains many of these inequalities in kindergarten through eighth grade reading ability growth. Relatively small reading ability gaps persist between non-Hispanic white children of native-born mothers and Puerto Rican children of native-born mothers, Asian children of foreign-born mothers, and other-Hispanic children in both generational status categories. Of these differences, all but the one for third-plus generation other Hispanics exist in initial reading ability. In other words, net of children's family SES, community immigrant concentration, and school percentage low-SES and minority enrollments, *most* children gain reading ability at equivalent rates. However, substantial gaps remain between third-plus generation non-Hispanic white children and non-Hispanic black children in both generational status categories and, to a lesser though still substantial and significant degree, Mexican children of foreign-born mothers.

Patterns of kindergarten through eighth grade mathematics ability growth generally resemble those of reading ability growth. Non-Hispanic black children of native-born mothers and Mexican, Puerto Rican, Cuban, and Other Hispanic children of both generational status types demonstrate significant gaps in initial mathematics ability relative to non-Hispanic white children of native-born mothers. For Cuban children of native-born mothers, this difference is positive, while all other differences reflect a non-Hispanic white advantage.

Once schooling begins, non-Hispanic black, Mexican, and other Hispanic children in both generational status categories exhibit slower rates of mathematics ability growth than non-Hispanic white children of native-born mothers. As with reading ability, non-Hispanic black children of foreign-born mothers experience a flatter predicted learning trajectory in mathematics than non-Hispanic white children of native-born mothers despite the two groups entering school with equivalent predicted mathematics ability levels.

As evidenced in the model of reading ability growth, within-group generational status inequalities in mathematics ability exist primarily in terms of initial ability. These initial intra-group differences exist among non-Hispanic black, Mexican, other Hispanic, and Asian children. Among non-Hispanic black children, this difference manifests as a foreign-born advantage; in all other groups native-born children possess the advantage in initial mathematics ability. Again, as with reading ability, schooling initial within-group inequalities in mathematics ability tend not to translate to within-group differences in mathematics ability growth. Only Mexican children exhibit a generational status gap in mathematics ability growth, as the children of foreign-born mothers gain mathematics ability more slowly than children of native-born mothers.

Family SES, community immigrant concentration, and school percentage low-SES and minority enrollments explain a large share of between- and within-group inequalities in mathematics ability growth. After introducing these statistical controls, small differences in mathematics ability trajectory exist between non-Hispanic white children of native-born mothers and first/second generation Asian and white children, Puerto Rican children in both generational status categories, and Cuban children of foreign-born mothers. Larger gaps exist between third-plus generation white children and non-Hispanic black children, especially those with foreign-born mothers, as well as Mexican children of foreign-born mothers and other Hispanic children of native-born mothers.

Taken together, the findings of Chapter 4 indicate that children of non-Asian minority immigrants tend to demonstrate disadvantages in reading and mathematics ability at school entry. However, net of their family socioeconomic circumstances and community/school contexts, children tend to fare equally well over the kindergarten through eighth grade timeframe. This is not the case for all groups, though, as non-Hispanic black children of both generational status classifications and Mexican children of foreign-born mothers do not receive the same schooling benefits as children from other racial/ethnic, national origin and generational status backgrounds. These children exhibit substantial longitudinal ability gaps relative to non-Hispanic white students.

Eighth Grade Academic Self-Concept

Examining two domains of academic self-concept: verbal/reading self-concept and mathematics self-concept, Chapter 5 consisted of an analysis of adolescents' non-cognitive schooling outcome variation across race/ethnicity, national origin, and generational status. In light of the patterns of association among race/ethnicity, national origin, and generational status on initial academic ability and K-8 ability growth reported in Chapters 3 and 4, the findings reported in Chapter 5 are somewhat unexpected.

In terms of verbal/reading self-concept, only Mexican children report significantly lower levels of self-concept than non-Hispanic white children of native-born mothers, despite prior analyses indicating all groups except Asians and Cubans demonstrate lower levels of reading ability growth in at least one generational status category. When measures of reading ability, gender, and family SES are added to the model, a surprising pattern of minority and first/second generation advantage in verbal/reading self-concept emerges.

Among Puerto Rican, Cuban, other Hispanic and Asian adolescents, those born to foreign-born mothers exhibit significantly higher levels of verbal/reading self-concept than their third-plus generation coethnic counterparts. In addition, Cuban, other Hispanic, and Asian children of foreign-born mothers, along with non-Hispanic black children of native-born mothers, demonstrate higher verbal/reading self-concept scores than third-plus generation non-Hispanic whites. Third-plus generation Mexican adolescents do not differ significantly from non-Hispanic white children of native-born mothers after controlling individual and family background measures, though those with foreign-born mothers still demonstrate a disadvantage relative to third-plus generation white adolescents.

Of the three school and community context measures included in the analysis, only school minority enrollment demonstrates a significant, positive relationship with verbal/reading self concept, and the magnitude of the effect is rather small. However, controlling for disadvantaged students' typically low-SES, high-minority school environments and more concentrated immigrant communities results in decreases in the magnitude of race/ethnicity, national origin, and generational status coefficients among all groups except Mexican children of foreign-born mothers. This shift indicates a positive academic self-concept effect of seemingly disadvantageous social contexts among minority children. This finding supports the frame-of-reference theory of self-concept construction, indicating that, for minority adolescents, it may be beneficial to compare themselves to other similarly minority students. Mexican children of foreign-born mothers do not exhibit this pattern, however; their results indicate that they derive a negative verbal/reading self-concept effect from their social and family contexts alike.

In the mathematics domain of self-concept, individual and family effects operate in much the same way as in the verbal/reading domain. However, the measures of broader social context have no significant direct association with mathematics self-concept, and controlling for social context results in only trivial changes in the other coefficients. Thus, findings suggest that mathematics self-concept is less subject to social contextual influences than verbal/reading self-concept.

Contributions

The present study, which in effect comprises three distinct (though closely related) studies, is poised to make several contributions to the extant body of literature on the educational experiences of the children of immigrants. In each area, the analysis of recently collected, large-scale, nationally representative data advances the current state of knowledge by providing results that are generalizable to contemporary cohorts of children nationwide.

The study of school readiness outcomes among the children of foreign- and native-born mothers contributes to this important area of research in two major ways. First, the present study conceptualizes school readiness along four dimensions, examining the under-analyzed general knowledge and approaches to learning domains alongside the more standard literacy and numeracy indices. Doing so allows for a more holistic understanding of children's varying strengths and weaknesses at kindergarten entry, and sets the stage for future research to conceptualize school readiness as a multidimensional construct that reflects development in multiple domains (DeRousie and Durham 2008).

Secondly, this study expands the scope of research on school readiness inequalities to include generational status differences in children's preparedness to begin formal schooling. In an era of large scale immigration of racial/ethnic minority families, when over 20 percent of school-age children the United States are members of either the first or second immigrant generation (White and Glick 2009), understanding the roots of educational success and failure among this potentially vulnerable segment of the population is doubtless important to the future of U.S. education.

Findings from this line of research are beginning to contribute to scholarly discourse. An article presenting many of the results reported in Chapter 3 was recently published in the *Journal of Early Childhood Research* (Hibel 2009).

The second component of the present study is also poised to contribute to the existing literature on generational status differences in immigrant children's early academic success. The majority of research on immigrants and education focuses on outcomes measured in high school or later (e.g., Bankston and Zhou 1997, Fuligni 1997, Glick and White 2003, Greenman and Xie 2007, Hirschman 2001, Kao and Tienda 1995, Pong, Hao, and Gardner 2005, White and Glick 2009). Among the studies that have examined earlier life course outcomes, research tends to focus on single achievement outcomes (e.g., Leventhal, Xue, and Brooks-Gunn 2006) or single immigrant groups (e.g., Crosnoe 2005). By analyzing two dimensions of academic ability growth from school entry through eighth grade and examining differences between and within multiple minority immigrant groups, the present study represents a step toward a more comprehensive understanding of the early educational inequalities that will shape the educational and life chances of the next generation of Americans.

The third and final component of the present study introduces large-scale, quantitative research on immigrant inequalities to the field of academic self-concept research. The propitious fit between social demographic theories of immigrant adaptation (e.g., the *immigrant optimism perspective*), sociological perspectives on the importance of social context for shaping individuals' academic attitudes (e.g., Alwin and Otto 1977, Davis 1966) and social psychological theories of self-concept construction [e.g., the frame-of-reference theory (Marsh and Parker 1984)] along with the present study's counterintuitive finding that children who experience material and educational disadvantages exhibit more positive levels of academic self-concept should make this final component of the present study of interest to a wide audience of education researchers. Future work aimed at more precisely modeling contextual effects on first/second generation children's academic-self concepts, examining changes in academic self-concept over time, and exploring the links between children of immigrants' academic self-concept and their subsequent educational achievement and attainment are examples of directions in which this new line of research might be expanded.

The present study has described and (at least partially) explained racial/ethnic, national origin, and generational status variation in children's educational experiences from the onset of formal schooling through the end of middle school. It is my hope that, through its analysis of nationally representative, longitudinal data, examination of variation in both cognitive and non-cognitive outcomes, and concomitant consideration of race/ethnicity, national origin, and generational status influences, the present study will stimulate and inform future research on the academic adaptation of children from the burgeoning ranks of the newest Americans.

Appendix

A.1: Chapter 3 Variable Descriptions

Table A.1

Variable Name	Description of Measure
Unreadiness: Literacy	Child scored in the bottom 20 percent in reading in the fall of kindergarten
Unreadiness: Numeracy	Child scored in the bottom 20 percent in mathematics in the fall of kindergarten
Unreadiness: General Knowledge	Child scored in the bottom 20 percent in general knowledge in the fall of kindergarten
Unreadiness: Behavior	Child scored in the bottom 22 percent in teacher rating of classroom behavior (approaches to learning) in the fall of kindergarten
Mother Attended College	Child's Mother received at least a bachelor's degree
Father Attended College	Child's Father received at least a bachelor's degree
Family SES *Z*-score	Standardized measure of child's family SES score, reflecting parental education, income, and occupational prestige
Family in Poverty	Child's household was below the federal poverty threshold in 1998
Family Income	Child's household income in 1998, in U.S. dollars
Male	Child is male
Urban Area	Child lived in a central city 1998
Number of Books in Home	How many books children's home included in 1998
Has Home Computer	Child's family had a home computer in 1998
Arts & Crafts	Child took art lessons and/or craft lessons in 1998
Sports/Clubs	Number of following activities in which child took part in 1998: attended sporting events, participated in athletic events, participated in organized clubs
Performing Arts	Child participated in organized performances, and/or dance lessons, and/or music lessons, and/or drama lessons in 1998
Educational Trips	Number of following trips on which child went in 1998: museum, zoo, library, concert
Head Start Attendance	Child attended Head Start prior to kindergarten entry

A.2: Supplementary Discussion of Mixed-Effects Modeling

Empirical Reading and Math Growth Trajectories

The process of modeling reading and mathematical ability growth begins with an examination of ECLS-K participants' empirical growth trajectories. Figures A.1 – A.4 present reading and math IRT test score trajectories along two measures of time: 1) children's age in years at the time of assessment and 2) semesters of schooling (fall kindergarten = 0). Observation of these empirical plots indicates that test score growth in both domains appears to follow a curvilinear form, whereby growth during the early years occurs at a faster rate than growth beyond approximately ten years of age or ten semesters of schooling (i.e., the end of the fourth-grade year). In addition, test score dispersion appears to increase over time, a phenomenon known as the academic fan-spread effect (Bast and Reitsma 1998, Stanovich 2000).

Figure A.1. Empirical Reading Trajectories by Child's Age

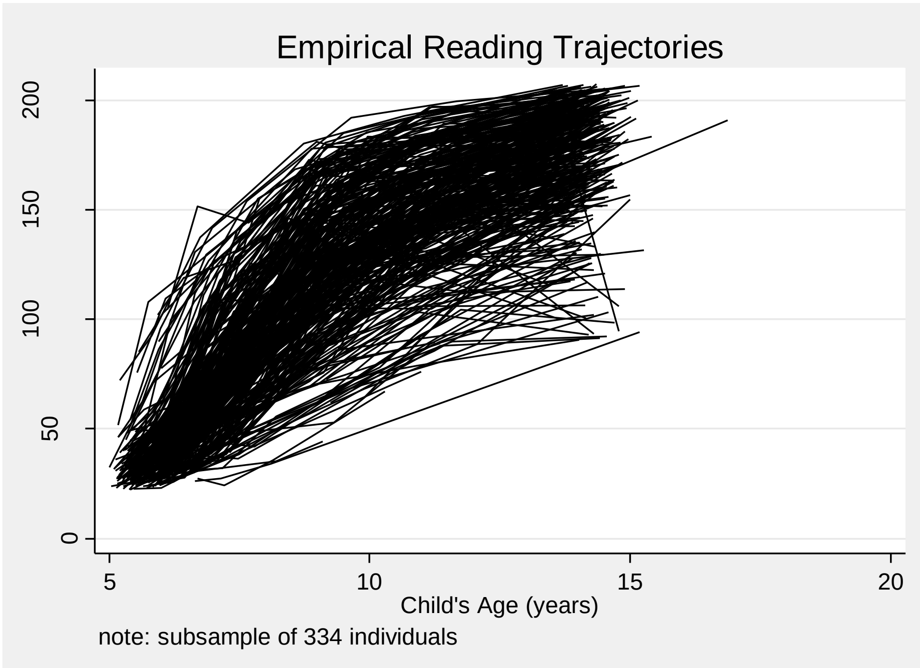


Figure A.2. Empirical Reading Trajectories by Semester

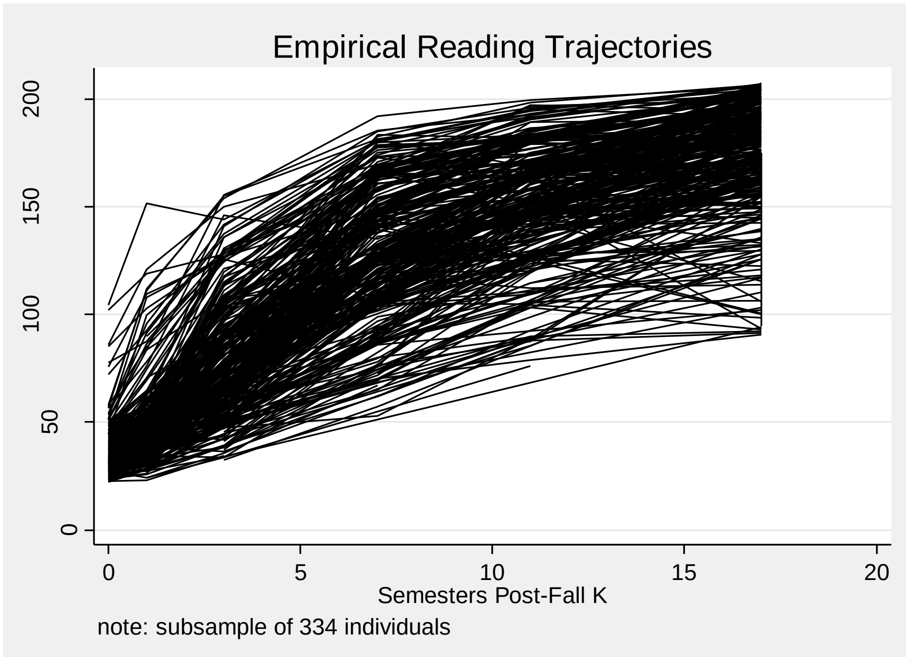


Figure A.3. Empirical Math Trajectories by Child's Age

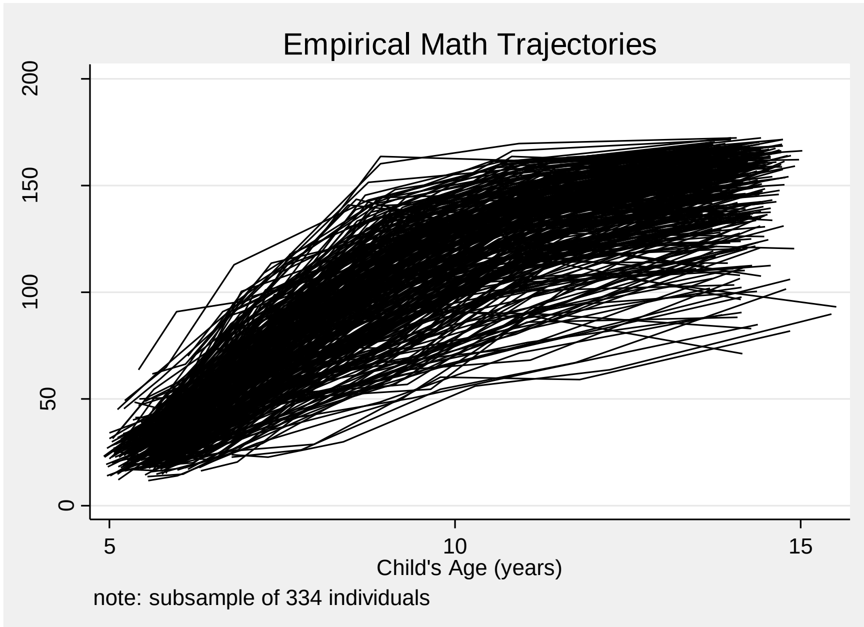
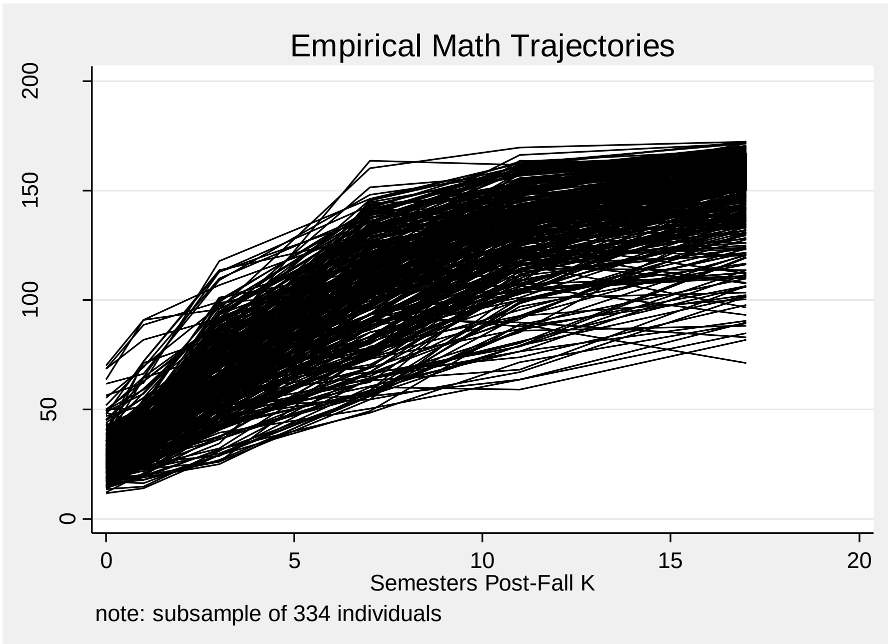


Figure A.4. Empirical Math Trajectories by Semester



Figures A.5 – A.8 present reading and math test score plots by child's age and semester with linear and quadratic OLS curves overlaying the observed data points. Visual inspection of these plots reinforces the conclusion that a non-linear functional form best represents the reading and math ability trajectories of children who entered kindergarten in 1998. An important distinction between the two time metrics can be observed in these figures. A semester-based time metric constrains the timing of all assessments to be equal within data collection waves, while the metric based on children's age permits assessments to occur along a continuous time scale. In terms of accurately modeling cognitive traits such as reading and math performance, a metric that more closely reflects children's age-related cognitive development would seem to be preferable. Variation in children's age within data collection waves is likely to be associated with within-wave variation in reading and math ability as well. Use of child's age as a measure of time allows this variation to be explicitly modeled.

Figure A.5. Estimated Linear and Quadratic Reading Score Curves by Child's Age

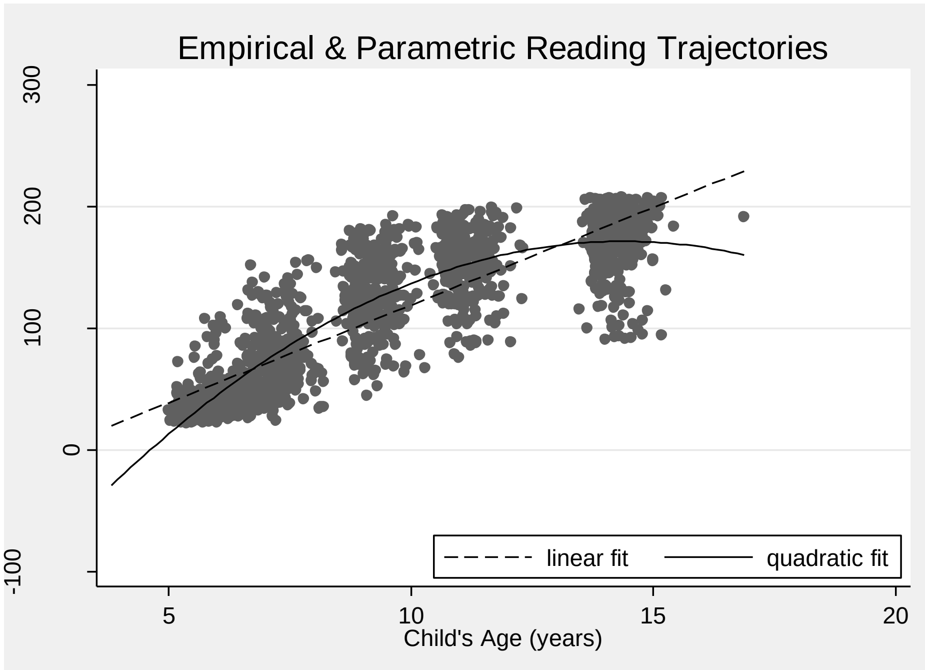


Figure A.6. Estimated Linear and Quadratic Reading Score Curves by Semester

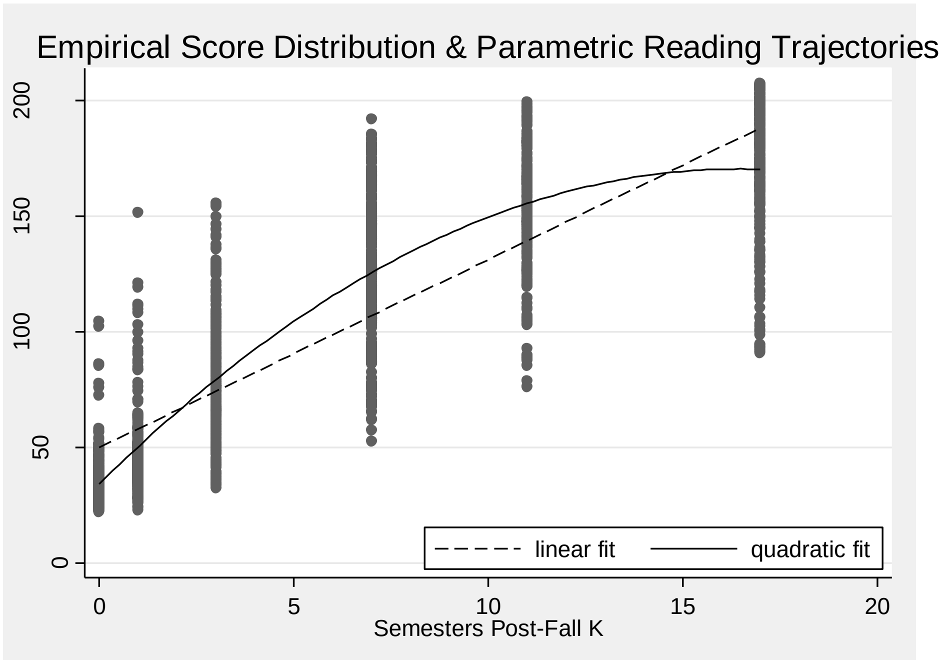


Figure A.7. Estimated Linear and Quadratic Math Score Curves by Child's Age

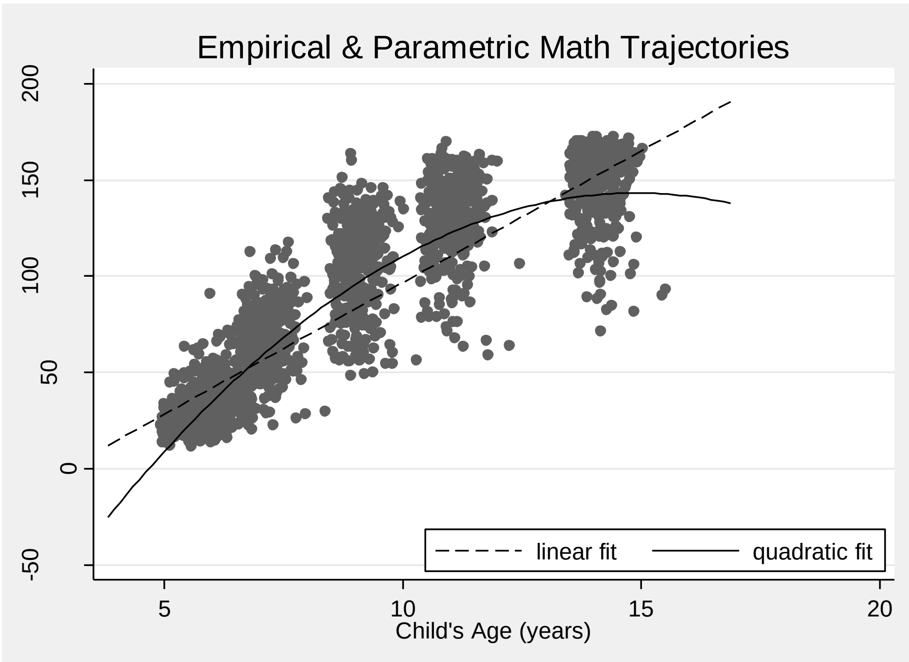


Figure A.8. Estimated Linear and Quadratic Math Score Curves by Semester

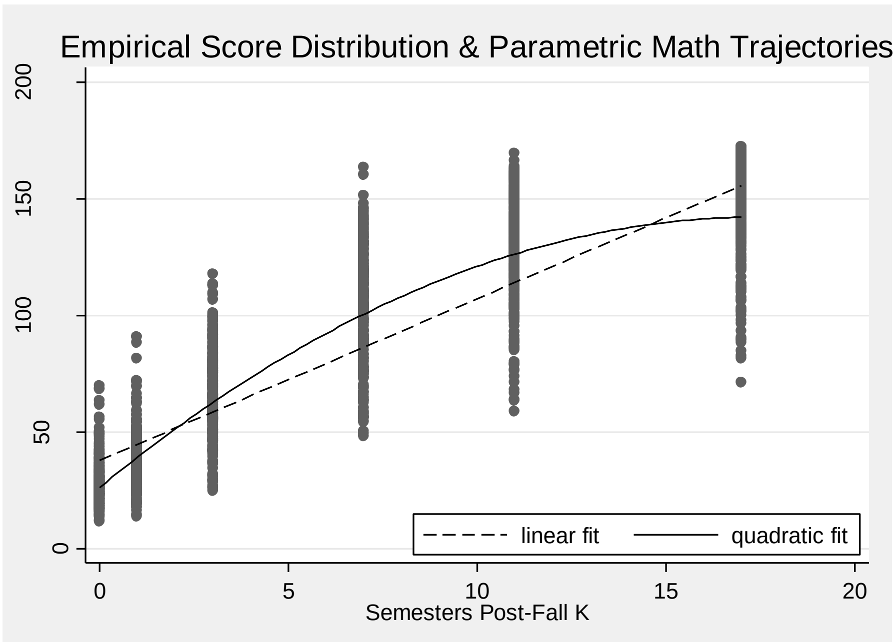


Table A.2 presents a statistical comparison of time metrics and OLS parametric forms. For each outcome and time metric, the nonlinear model specification provides improved model fit as indicated by R^2, AIC, BIC, and the results of likelihood ratio tests between linear and quadratic models. Because the “age” model and “semester” model have equal degrees of freedom, a likelihood ratio test (which evaluates increment to model fit between two nested models) is not an applicable test of the difference in model fit between the two time metrics. While the quadratic curve provides a better fit to the data than the linear model, the constrained time metric (semester) results in slightly better model fit statistics than the continuous metric (child’s age).

Table A.2

Fit Statistics for Uncoditional OLS Models

	Reading Score				Math Score			
	Child's Age		Semester		Child's Age		Semester	
	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic	Linear	Quadratic
R^2	0.758	0.819	0.764	0.831	0.776	0.825	0.778	0.831
AIC	496881.5	481761.2	495747.6	478193.6	485026.9	471666	484567.9	469926.7
BIC	496899.3	481787.8	495765.4	478220.2	485044.7	471692.6	484585.7	469953.3
Likelihood Ratio Test	$p < 0.9999$		$p < 0.9999$		$p < 0.9999$		$p < 0.9999$	

Table A.3

Random Effects Components of Mixed-Effects Models of K-8 Reading Ability Growth Reported in Table 4.3

Model 1

VARIANCE COMPONENTS			PSEUDO-R^2	
Level-1			Level-1	0.46
	Within-Person	100.54***	Level-2 Intercept	0.78
			Level-2 Linear Slope	0.29
Level-2			Level-2 Quad.	0.20
	Intercept	62.39***	Level-3 Intercept	0.78
	Semester	11.72***	Level-3 Linear Slope	0.48
	Semester^2	0.04***	Level-3 Quad.	0.33
	Corr.: Intercept/	0.71***		
	Corr.: Intercept/	-0.91***		
Level-3				
	Intercept	19.48***		
	Semester	4.12***		
	Semester^2	0.02***		

Model 2

VARIANCE			PSEUDO-R^2	
Level-1			Level-1	0.45
	Within-Person	101.29***	Level-2 Intercept	0.82
			Level-2 Linear Slope	0.30
Level-2			Level-2 Quad. Slope	0.20
	Intercept	50.48***	Level-3 Intercept	0.84
	Semester	11.55***	Level-3 Linear Slope	0.54
	Semester^2	0.04***	Level-3 Quad. Slope	0.67
	Corr.: Intercept/	0.76***		
	Corr.: Intercept/	-0.95***		
Level-3				
	Intercept	14.01***		
	Semester	2.76***		
	Semester^2	0.01***		

Table A.3, continued

Model 3

VARIANCE		PSEUDO-R^2	
Level-1		Level-1	0.45
Within-Person	101.31***	Level-2 Intercept	0.82
		Level-2 Linear Slope	0.30
Level-2		Level-2 Quad. Slope	0.20
Intercept	50.51***	Level-3 Intercept	0.84
Semester	11.54***	Level-3 Linear Slope	0.54
Semester^2	0.04***	Level-3 Quad. Slope	0.67
Corr.: Intercept/	0.76***		
Corr.: Intercept/	-0.95***		
Level-3			
Intercept	13.63***		
Semester	2.77***		
Semester^2	0.01***		

Model 4

VARIANCE		PSEUDO-R^2	
Level-1		Level-1	0.45
Within-Person	101.32***	Level-2 Intercept	0.82
		Level-2 Linear Slope	0.30
Level-2		Level-2 Quad. Slope	0.20
Intercept	50.48***	Level-3 Intercept	0.84
Semester	11.52***	Level-3 Linear Slope	0.54
Semester^2	0.04***	Level-3 Quad. Slope	0.67
Corr.: Intercept/	0.76***		
Corr.: Intercept/	-0.95***		
Level-3			
Intercept	13.61***		
Semester	2.75***		
Semester^2	0.01***		

Table A.4

Random Effects Components of Mixed-Effects Models of K-8 Reading Ability Growth Reported in Table 4.5

Model 1

VARIANCE COMPONENTS		PSEUDO-R^2	
Level-1		Level-1	0.50
Within-Person	58.46***	Level-2 Linear Slope	0.26
		Level-2 Quad. Slope	0.33
Level-2		Level-3 Intercept	0.77
Intercept	45.97***	Level-3 Linear Slope	0.24
Semester	8.36***	Level-3 Quad. Slope	0.00
$Semester^2$	0.02***		
Corr.: Intercept/	0.83***		
Corr.: Intercept/	-0.96***		
Level-3			
Intercept	14.04***		
Semester	2.36***		
$Semester^2$	0.01***		

Model 2

VARIANCE		PSEUDO-R^2	
Level-1		Level-1	0.50
Within-Person	58.08***	Level-2 Intercept	0.83
		Level-2 Linear Slope	0.27
Level-2		Level-2 Quad. Slope	0.33
Intercept	38.43***	Level-3 Intercept	0.87
Semester	8.26***	Level-3 Linear Slope	0.47
$Semester^2$	0.02***	Level-3 Quad. Slope	0.00
Corr.: Intercept/	0.86***		
Corr.: Intercept/	-0.98***		
Level-3			
Intercept	7.93***		
Semester	1.65***		
$Semester^2$	0.01***		

Table A.4, continued

Model 3			
VARIANCE		PSEUDO-R^2	
Level-1		Level-1	0.50
Within-Person	58.10***	Level-2 Intercept	0.83
		Level-2 Linear Slope	0.27
Level-2		Level-2 Quad. Slope	0.33
Intercept	38.35***	Level-3 Intercept	0.87
Semester	8.26***	Level-3 Linear Slope	0.47
Semester^2	0.02***	Level-3 Quad. Slope	0.00
Corr.: Intercept/	0.86***		
Corr.: Intercept/	-0.98***		
Level-3			
Intercept	7.98***		
Semester	1.65***		
Semester^2	0.01***		

Model 4			
VARIANCE		PSEUDO-R^2	
Level-1		Level-1	0.50
Within-Person	58.11***	Level-2 Intercept	0.83
		Level-2 Linear Slope	0.27
Level-2		Level-2 Quad. Slope	0.33
Intercept	38.26***	Level-3 Intercept	0.87
Semester	8.25***	Level-3 Linear Slope	0.47
Semester^2	0.02***	Level-3 Quad. Slope	0.00
Corr.: Intercept/	0.86***		
Corr.: Intercept/	-0.98***		
Level-3			
Intercept	7.96***		
Semester	1.64***		
Semester^2	0.01***		

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RESEARCH AND TEACHING INTERESTS

Early-Life Course Stratification Processes, Sociology of Education (school readiness, early academic inequality, school organizational practices), Immigration and Inequality, Quantitative Research Methods

PUBLICATIONS

Hibel, Jacob, George Farkas, and Paul Morgan (Forthcoming). "Who is Placed into Special Education?" *Sociology of Education*

Hibel, Jacob (2009). "Roots of Assimilation: Generational Status Differentials in Ethnic Minority Children's School Readiness", *Journal of Early Childhood Research,* 7(2), 135 – 152.

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