

Trends in Educational Attainment by Sex, Race/Ethnicity, and Nativity in the United States, 1989-2005*

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August 20, 2007

Running Head: Education Trends in the U.S.

Key Words: Education, Race/Ethnicity, Sex, Trends

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Abstract

Objective. Trends in education are particularly significant because they affect individual life choices and chances. Yet surprisingly few studies have examined differences in educational attainment by detailed demographic subpopulations in recent years. This research documents trends in education by age, sex, race/ethnicity, and nativity between 1989 and 2005 to gain a better understanding of how disparities in education have changed over time.

Methods. We employ the 1989-2005 National Health Interview Surveys (n=1,054,062).

Results. We find that among individuals aged 25-44 in 2005, foreign-born Mexican American men obtained just 9.5 years of education whereas comparable women had 9.8 years, and foreign-born Cuban American men had 13.2 years of education whereas comparable women had 13.7 years. We also show increases in education for all race/ethnic groups over time, with the most substantial gains among Hispanic subpopulations.

Conclusion. Our results provide insight into trends in education, highlight the value of disaggregating educational attainment levels by demographic subpopulations, and can aid researchers and policymakers in identifying vulnerable populations.

There have been tremendous changes in educational attainment in the United States in recent decades that reflect, in part, substantial changes in the racial and ethnic composition of the U.S., immigration, and changing opportunities for women, who are increasingly delaying childbearing and marriage, and joining the labor force. High levels of education are associated with such future life outcomes as high income, improved psychological resources and well being, and improved health and survival. And unlike income or occupation, education is usually determined at a relatively young age and persists over the life course, regardless of changes in health or labor force participation; because of this, educational attainment has become a central variable in the understanding of stratified health and mortality outcomes in the United States and elsewhere (Crimmins 2005; Hummer et al. 1998; Smith 2005). The purpose of this paper, then, is to document trends in educational attainment by race/ethnicity, nativity, age, and sex in the United States from 1989-2005.

Background Studies

Individuals with high levels of education are more likely to possess a greater sense of personal control (Mirowsky and Ross 1998) and avoid stressful life events such as divorce, unemployment, illness (Martin and Bumpass 1989), criminality, and incarceration (Lochner and Moretti 2004; Pettit and Western 2004). Educational attainment increases material well being, including chances for employment, occupational advancement, higher incomes, job benefits (including health insurance, pension plans, stock options, and retirement benefits), and job security (DiPrete and Buchmann 2006). Education is also considered a fundamental determinant of health and mortality. That is, higher levels of education contribute to healthier behaviors, faster recoveries from illness, better interactions with health care professionals, smoother

navigations through the health care system, better compliance with medical regimens, and ultimately, longer lives (Crimmins 2005; Link and Phelan 1995; Mirowsky and Ross 1998; Rogers, Hummer, and Nam 2000; Smith 2005).

Females are now outperforming males on many measures of educational attainment, including rates of graduation from high school and college (Bae et al. 2000; Freeman 2004). For example, women now earn 55% of college degrees in the United States (Peter et al. 2005). The emerging gender gap in education has been attributed not only to greater returns to education on income for women than in previous decades, but also to other factors that safeguard against poverty, such as decreases in both the likelihood of divorce (Martin and Bumpass 1989) and non-marital childbearing (Rindfuss, Morgan, and Offutt 1996; Ventura et al. 1995). While informative, most studies examine all racial/ethnic groups combined or examine only large select racial/ethnic subpopulations. For example, DiPrete and Buchmann (2006) based their recent study on whites and blacks aged 25-34. But it is also important to see if these gender educational patterns persist for other race/ethnic subpopulations and ages.

Educational attainment disparities by race/ethnicity have persisted over time. The National Center of Education Statistics (NCES) found an increasing gap in educational attainment from 1974 to 2003 for all racial minorities they examined (Hispanics and non-Hispanic whites, blacks, Asians, and Native Americans), with the largest gap in education between non-Hispanic whites and Hispanics (Hudson et al. 2005). But few studies examine variation among Hispanic subgroups, including Puerto Ricans, Cubans, and Mexicans. Nonetheless, there are strong reasons to suspect considerable heterogeneity among U.S. Hispanics, particularly when comparing Hispanic immigrant and native-born populations, due to the political and economic conditions of the countries of origin (Massey 1999; Rumbault 1997),

the types of work available to migrants (Massey 1999), and the distance traveled to the U.S. (Long 1973). Feliciano (2005), in a study of 32 immigrant groups who were compared to their non-migrant counterparts, found that all migrant groups except Puerto Ricans tended to be more positively selected on education but that there exists substantial variation between and within groups related to timing of migration as well as distance to the United States.

Foreign-born individuals now comprise over ten percent of the U.S. population (U.S. Bureau of the Census 2001). Overall, native-born adults average higher levels of education than foreign-born adults. For instance, the percentage of individuals aged 25 and above who were high school graduates in the year 2000 was 86.6 percent among the native-born population, but 67.0 percent among the foreign-born population. Further, educational attainment can vary dramatically by country of birth. The percentage of adults aged 25 and above in the year 2000 who were high school graduates was just 33.8 percent for those born in Mexico, over 80 percent for those born in Europe, Asia, or Northern America, and 94.9 percent among those born in Africa (U.S. Bureau of the Census 2001).

Wojtkiewicz and Donato (1995) examined the role that nativity plays in patterns of educational attainment among Mexican, Puerto Rican, and non-Hispanic white youth and found that U.S.-born Mexican Americans have higher educational attainment than foreign-born Mexican immigrants. Borjas (1991) claims that Mexicans with high skills and education may enjoy relative advantages in Mexico that encourage remaining in the country, whereas Mexicans with low skills and education suffer greater relative disadvantage that encourage immigration to the U.S. Moreover, immigration between Mexico and the U.S. is streamlined because of strong and well-established social networks, including family reunification, the common border, and the relatively short distance and cost (Feliciano 2005). Mainland- and island-born Puerto Ricans

have similar levels of education in part because both groups are U.S. citizens and can therefore move freely around the country, and because they do not incur the same restrictions and barriers that immigrants face (Feliciano 2005; Wojtkiewicz and Donato 1995). Generally, greater costs and longer distances select migrants with higher levels of education. For instance, Feliciano (2005) demonstrates that because the U.S. shares a border with Mexico, but is thousands of miles from any Asian country, compared to Mexican immigrants, Asian immigrants are likely to be more highly selected on education.

Glick and White (2003b) found that immigrant and second generation youth are more likely than third or higher generation peers to complete secondary school and go on to post-secondary schools, even when controls for structural and family background are included. Perreira et al. (2006) looked at racial/ethnic variation in high school completion among first, second, and third generation individuals in the United States, and found that first generation children on average obtain more education than their parents. However, the cultural capital and immigrant optimism that helped the first generation of immigrant children weakens in the second and third generations, especially among Hispanic and African American children.

Aims

In sum, the sociological and demographic literatures are interested in educational attainment trends and differences because educational attainment plays such a critical role in the subsequent life chances of American adults. However, there is clearly room in the literature for a detailed examination of educational attainment trends across groups, particularly when detailed subpopulations can be examined. Here, we document trends in educational attainment by age, sex, race/ethnicity (including detailed Hispanic subpopulations), and nativity between 1989 and

2005, to provide a more detailed and nuanced understanding of educational trends in the United States than prior research offers.

Data

We employ the National Health Interview Survey (NHIS) for the years 1989 through 2005 to examine educational attainment trends in the U.S. The annual NHIS is well-suited to our research aims because it: (1) contains educational attainment information for a number of relatively small racial/ethnic groups; (2) is very large; (3) is nationally representative; (4) includes consistent measures over time; and (5) includes nativity, beginning in 1989, which is important to consider in examining trends in educational attainment. The NHIS includes non-institutionalized individuals living in the U.S. The 17 years of data allow us to track recent changes over time, including, in many instances, the point at which the education sex gap flips from a male to a female advantage.

Educational attainment, the dependent variable, is coded continuously from 0 to 18 or more years. NHIS changed the coding strategy for education between 1996 and 1997 to ask educational attainment as a categorical variable that captured whether respondents had completed 1-12 years of school, graduated high school, or obtained an associates, bachelors, masters, professional, or doctoral degree. To adjust for this change, we converted the categories into comparable years of education and include a dummy variable for whether persons were surveyed before 1997 or in 1997 or after. We graphed the mean education level by year and did not discern any breaks between 1996 and 1997 due to coding changes, which suggests that the measurement change has very little if any effect on the study results.

The primary independent variables of interest are calendar period, race/ethnicity, nativity,

age, and sex. Sex is coded dichotomously with females as the referent. We code race/ethnicity categorically as white (referent), black, Asian, and Native American (among non-Hispanics), and Mexican, Puerto Rican, and Cuban (among Hispanics). Nativity indicates whether individuals are U.S.-born (referent) or foreign-born. Although mainland- and island-born Puerto Ricans are U.S. citizens, for consistency with other race/ethnic groups, we refer to those born on the mainland as U.S.-born and those born on the island as foreign-born. While there are a few foreign-born Native Americans (most likely indigenous persons from Canada, or Central or South America), the small numbers preclude detailed analyses and are therefore dropped from models that examine education trends for foreign-born populations. Calendar year is measured as the survey year in which the individual responded and is coded continuously from 0 (in 1989) to 16 (in 2005). Age is measured in five-year categories that range from 1 (ages 25-29) to 13 (ages 85 and above); we also include a squared term to capture the curvilinear relationship between age and educational attainment. We restrict the analyses to adults aged 25 or older, as most people have completed their education by that time. After eliminating 1.8% of the cases that are missing data on key variables, our data set includes 1,054,062 records.

We use ordinary least squares (OLS) regression to estimate trends in educational attainment. Our independent variables include age, sex, race/ethnicity, nativity, calendar period, and the dummy variable that indicates the change in the wording of the education question. We tested for two-, three-, and four-way interactions between sex, race/ethnicity, nativity, and calendar period by using the following strategy. First, we tested for all possible two-way interactions and kept only those groups of interactions that significantly improved the model fit using an F-test. We excluded any two-way interactions that did not improve model fit (e.g., calendar period by nativity), and did not test for higher order interactions that built on those two-

way interactions. Second, if a given set of two-way interactions were significant, then we tested for three-way interactions; only the interactions for nativity by sex by race/ethnicity were significant. The four-way interactions were not significant.

We used F-tests to assess improvements in model fit because some of the variables have multiple categories so that the t-tests for individual coefficients are more likely to be significant due to chance alone (Type I error). Separate analyses (not shown) included all possible two-, three-, and four-way interactions, and found largely identical predicted values, further confirming that our multivariate models capture the important trends and patterns in educational attainment. We estimate our model separately among those aged 25-44, 45-64, and 65 years and older to account for different incentives for completing education among those from very different birth cohorts, and to distinguish those aged 65 and older who may be most marked by selective mortality among those who are least educated. We disaggregate by age group because sex differences – especially the general female education advantage at younger ages and the male educational attainment advantage at older ages – are obscured in models that combine age groups.

To adjust for the complex sampling frame of the NHIS, we use the “svy” commands in Stata to adjust for PSU, stratum, and population weights, which produces appropriate coefficients, standard errors, and weights (Stata Corp. 2005; NCHS 2002). We adjust for changes in the NHIS sampling frame over time, using the method described by Korn and Graubard (1999).

Results

Table 1 presents mean years of sex-specific educational attainment by race/ethnicity, stratified

by age group and nativity, and shows several important patterns. First, educational attainment is generally higher among younger than older individuals, as would be expected. Among those aged 25-44 who were born in the U.S., all racial/ethnic groups average 12 or more years of education – the equivalent of a high school degree – except for Mexican Americans. But among those aged 65 and older and born in the U.S., only white and Asian American males average 12 or more years of education. Similarly, younger foreign-born individuals exhibit higher average educational attainment than older foreign-born individuals. Second, males have higher levels of educational attainment in some racial/ethnic groups, but that is not always the case. For example, U.S.-born white males aged 25-44 have a slightly lower average level of attainment (13.65 years) than their female counterparts (13.68 years), although older U.S.-born males consistently have higher levels of education than their female counterparts. Finally, among non-Hispanics, foreign-born individuals typically have higher levels of education than their U.S.-born counterparts. But among Hispanics, foreign-born individuals more frequently have lower levels of education than U.S.-born Mexican and Cuban Americans; the same is true when comparing island- to mainland-born Puerto Ricans. Although these results are informative, they do not adjust for calendar period trends, differences in age-composition within age groups, and changes in the wording of the educational attainment question across survey years. Thus, we now turn to the multivariate models.

Table 1 about here

Table 2 shows the OLS regression coefficients for the demographic covariates on educational attainment, separately estimated for the three age groups. We present first-, second- (two-way), and third-order (three-way) interactions that we estimated using the model building strategy described above. We use the coefficients in Models 1-3 to calculate the predicted mean

levels of education in Tables 3-5, respectively, while holding age, age-squared, and the change in the wording of the education question at their mean levels. We discuss the results in Tables 3-5 because they can be understood more intuitively, but we refer to the coefficients from Table 2 to clarify our discussion as needed.

Table 2 about here

Adults Aged 25-44

Table 3 presents the predicted levels of education for adults aged 25-44, as based on Table 2, Model 1. For both U.S.-born (Panel A) and foreign-born (Panel B) young adults, the final rows of each panel show the difference in average educational attainment between 1989 and 2005, with positive values indicating increasing average levels of educational attainment over time. These change values are the same for U.S.- and foreign-born groups, by race/ethnicity and sex, due to the lack of a significant interaction for nativity by sex by calendar period.

Women averaged greater increases in education between 1989 and 2005 than men for all race/ethnic groups. For example, between 1989 and 2005, U.S.-born white males aged 25-44 gained 0.32 years of education on average, but their female counterparts gained 0.64 years. Among U.S.-born whites, blacks, Native Americans, and Puerto Ricans, the more rapid increases in educational attainment among women resulted in higher average levels of education than men in 2005 – a reversal from the sex difference found among those groups in 1989. Moreover, compared to U.S.-born Mexican American men, comparable Mexican American women enjoyed higher levels of educational attainment throughout this period. And compared to U.S.-born Cuban men, U.S.-born Cuban women had the same educational attainment levels in 1989 but greater educational attainment levels in 2005. Among foreign-born individuals, males averaged more education than females for all groups but Puerto Ricans and Cubans in 1989, but by 2005

females in all Hispanic subgroups (but none of the non-Hispanic subgroups) exhibited higher average levels of educational attainment than their male counterparts.

Table 3 about here

While all racial/ethnic groups of young adults increased their average educational attainment over time, the rate of increase was greater for some race/ethnic groups than for others. Whites, blacks, and Native Americans had the smallest increases between 1989 and 2005 (less than 1 year for both males and females), whereas Mexicans saw the greatest increases (2.4 years for males and 2.7 years for females), followed by Asian Americans and Cuban Americans (over a year for both males and females). The large improvements in educational attainment are particularly important for U.S.- and foreign-born Mexican Americans, who began with the lowest levels of education in 1989 and still lagged behind all groups in 2005. In contrast, U.S.- and foreign-born Asian Americans were among the most educated in 1989, and they improved their advantage substantially by 2005, thus continuing to show the highest levels overall.

There are sizeable differences among Hispanic subgroups. In 1989, U.S.-born Mexican Americans averaged 9.8 years of education in 1989, but U.S.-born Cuban Americans averaged 12.8 years. Both groups experienced substantial increases over time, but by 2005, U.S.-born Mexican Americans still had the lowest average levels of education across the race/ethnic groups examined here, whereas U.S.-born Cuban Americans averaged higher levels of education than any other group except Asian Americans. We also found important differences between U.S.- and foreign-born Hispanics and non-Hispanics. At all time points, U.S.-born non-Hispanics (i.e., whites, blacks, and Asian Americans) had *lower* average levels of education by sex than their foreign-born counterparts. But U.S.-born Hispanics (i.e., Mexican Americans, Puerto Ricans, and Cuban Americans) had *higher* levels of education than their foreign-born counterparts.

Adults Aged 45-64

Table 4 displays the predicted values of educational attainment for adults aged 45-64, as derived from Table 2, Model 2. Some differences emerge when comparing the results from those aged 25-44 to those aged 45-64. In 1989 and among U.S.-born adults, males and females of all race/ethnic groups aged 45-64 averaged lower levels of education than comparable race/ethnic and sex groups aged 25-44 (compare Tables 3 and 4). But between 1989 and 2005, individuals in all sex and race/ethnic groups aged 45-64 made greater gains in educational attainment than comparable individuals aged 25-44. Thus, by 2005 many U.S.-born groups aged 45-64 had similar if not higher levels of education than their counterparts aged 25-44. For example, between 1989 and 2005, U.S.-born Puerto Rican women aged 25-44 gained 1.12 years of education whereas Puerto Rican U.S.-born women aged 45-64 gained 4.00 years, which converted a wide disadvantage in educational attainment among middle-aged Puerto Rican women in 1989 to a slight advantage in 2005.

Table 4 about here

Between 1989 and 2005, all race/ethnic and sex groups aged 45-64 gained at least 1 year of educational attainment, on average. But in contrast to women aged 25-44, women aged 45-64 often had very similar increases by race/ethnicity in educational attainment between 1989 and 2005. Thus among those aged 45-64, men in all race/ethnic groups averaged more education than their female counterparts in 2005, with the exception of U.S.- and foreign-born Mexican Americans, where females had a very slight advantage.

There are substantial differences in the rate of increase of educational attainment across race/ethnic groups in this age group. Puerto Ricans on average increased their educational levels

by 4 years, Mexican and Cuban Americans increased by over 3 years, Asian and Native Americans increased by over 2 years, and whites and blacks increased by over 1 year. Although Mexican Americans increased their educational levels the most quickly among those aged 25-44 (Table 3), Puerto Ricans increased their levels most rapidly among those aged 45-64 (Table 4). By 2005, U.S.- and foreign-born Mexican Americans aged 45-64 were still the least educated group, whereas Asian Americans were often the most educated.

There are marked differences among Hispanics aged 45-64. In 1989, U.S.-born Mexican Americans had just under 9 years of education on average, compared to about 11 years among U.S.-born Cuban Americans. Although both groups saw remarkable growth over time, Cuban Americans still had an average of 2 additional years of education than Mexican Americans in 2005. The differences were even more stark when comparing foreign-born Mexican and Cuban Americans. Compared to their foreign-born Mexican origin counterparts, foreign-born Cuban Americans had over twice the level of education in 1989, and still averaged about 4.5 to 5.7 years more education by 2005. As with those aged 25-44, U.S.-born Hispanics aged 45-64 averaged higher levels of education than their foreign-born counterparts, but in contrast to those aged 25-44, foreign-born Asian Americans aged 45-64 also had lower levels of education than their U.S.-born counterparts.

Adults Aged 65 and Over

Table 5 shows the predicted levels of educational attainment among those aged 65 and older, from Table 2, Model 3. Contrary to those at younger ages, males aged 65 and older demonstrate greater increases in education between 1989 and 2005 than females – about 0.5 years more for males than females on average across all race/ethnic groups. Among U.S.-born

adults aged 65 and older, males typically had higher education levels than females in 2005, with the exception of blacks and Native Americans.

Table 5 about here

As in younger age groups, there are substantial race/ethnic differences in changes in educational attainment between 1989 and 2005. Puerto Ricans increased their educational levels on average by 4 to 5 years between 1989 and 2005, followed by Asian Americans, Mexican Americans, Native Americans, blacks, whites, and Cuban Americans. As in younger age groups, Mexican Americans aged 65 and older experienced some of the greatest increases in education, but in contrast to younger adults, Cuban Americans aged 65 and older increased their educational levels by substantially less than one year. Similar to the results found among younger adults, Mexican Americans aged 65 and older still had lower levels of education in all time periods than any other race/ethnic group, despite their impressive increases in educational attainment between 1989 and 2005.

Hispanics age 65 and older continue to show substantial differences in educational attainment in 2005. U.S.-born Mexican Americans had 3 to 4 years less education than U.S.-born Cuban Americans in 1989, a difference that closes to a still sizable 0.76 to 1.65 years by 2005. In contrast, mainland-born Puerto Ricans aged 65 and older increased their education faster than Mexican Americans, so that Puerto Ricans went from a less than one year advantage in 1989 to a 2.5 year advantage over Mexican Americans in 2005. Similar to those aged 45-64, U.S.-born Hispanics and Asian Americans aged 65 and older have higher levels of educational attainment at each time point and by sex than their foreign-born counterparts, with more mixed differences for blacks and whites.

Conclusion

Our results document race/ethnic, sex, and nativity differences in educational attainment over time and across age groups in the United States between 1989 and 2005. Further, we reveal substantial differences among Hispanics – although Mexican Americans, Puerto Ricans, and Cuban Americans are often combined in national analyses. Recent research has found that the male advantage in educational attainment, relative to females, has eroded in recent cohorts (Bae et al. 2000; DiPrete and Buchmann 2006). We find that this is generally true for U.S.-born adults aged 25-44 between 1989 and 2005, among a more detailed set of race/ethnic groups than has been examined previously. But Asian American males aged 25-44 still average higher levels of educational attainment than their female counterparts, although the gap between the two groups has narrowed between 1989 and 2005. Among foreign-born adults aged 25-44, however, non-Hispanic males averaged more years of education than their female counterparts, although foreign-born Hispanic females aged 25-44 average higher levels of education than comparable males. Older males in 2005 generally had more years of education than comparable females, whether U.S.- or foreign-born, with little sign that those gaps are closing. That is, males aged 65 and older typically made greater gains in education between 1989 and 2005 than women. Adults aged 45-64 exhibited only minor sex differences in changes in educational attainment between 1989 and 2005. Thus, women's relative gains in education vis-à-vis men are largely restricted to those aged 25-44.

We also find substantial variation among race/ethnic groups. Asian American males at all ages and regardless of nativity have the highest mean levels of education in the United States – consistently more than 15 years – in 2005. Asian American females in 2005 either have the highest educational levels among females, or are second only to white females, depending on age

and nativity. In contrast, Mexican Americans are consistently the least educated in 2005 and never attain a mean value of 13 or more years in the tables presented herein, regardless of age, sex, or nativity. U.S.-born blacks and Native Americans of all ages also continue to average relatively low levels of educational attainment – often one or more years less than their white counterparts.

Substantial differences exist among Hispanic subgroups, including Mexican Americans, Puerto Ricans, and Cuban Americans. Although Mexican Americans consistently had the lowest average levels of educational attainment, Cuban Americans were often near the top – sometimes above non-Hispanic whites, depending on the age group and sex. Across all age groups, U.S.-born Hispanics had more average years of education than their foreign-born peers; that differential was not always the case among non-Hispanics. Mexican Americans have the largest education gap between the native- and foreign-born subpopulations. In 2005, 25-44 year-old foreign-born Mexican American men had 9.5 years of formal schooling on average, about 2.7 years fewer than their U.S.-born counterparts. Thus, foreign-born Mexican Americans with low levels of education will need to rely on their skills and work experience for employment, and their limited education may hinder occupational advancement. The close proximity of Mexico to the United States, the extensive and well-established social networks between the two countries, and the demand for low-skilled labor in the United States encourages migration of individuals with low education levels from Mexico into the U.S. (Feliciano 2005; Long 1973; Massey 1999; Rumbaut 1997). In contrast, white, black, and Asian immigrants aged 25-44 possess higher levels of education than their U.S.-born counterparts – a differential that is consistent with the high levels of education among European, Asian, and African immigrants (U.S. Bureau of the Census 2001), and with the selectivity on education that results from greater costs and longer

distances associated with immigration.

The average educational levels for most (but not all) sex and race/ethnic groups are higher among 45-64 than among 25-44 year olds in 2005. The high levels of education among those aged 45 to 64 may result from: (1) the continued acquisition of additional years of education among older adults, (2) the influence of selective premature mortality among the least educated individuals that would be much more important at older than younger ages, (3) the slower rates of increase in education among those aged 25-44 than among those aged 45-64 between 1989 and 2005 (as shown in the final rows of Panels A and B on Tables 3 and 4), and (4) the exclusion of the institutionalized populations from the sample. Future work might fully explore each of these possibilities with panel data that can examine the ages at which individuals complete their highest levels of education, and account for selective mortality.

Our results may overstate educational attainment for subpopulations with high rates of institutionalization and/or relatively high rates of mortality. For example, black males with low levels of education are more likely to be in prison (Pettit and Western 2004) and more more likely to die at young ages than their white counterparts (Rogers et al. 2000), and would therefore be missing from our sample of civilian, non-institutionalized adults. Social policies that aggressively promote educational attainment among black males, as well as other groups with lower average levels of education, may result in higher rates of employment, better health and longevity outcomes, more successful marriages, and lower rates of incarceration and other forms of institutionalization – factors that may benefit not only individuals but also their families and communities.

NHIS data are attractive not only for their socioeconomic detail, but also for their ability to examine race/ethnic disparities in health. The NHIS core contains rich information on multiple

socioeconomic characteristics, including income, employment, and education; and supplemental files ascertain information on sources of income, including retirement income, wealth, assets, and poverty. NHIS can further contribute to greater understanding about health disparities. Indeed, future work could examine how race/ethnic, sex, and nativity trends in educational attainment over time and across ages contribute to a widening or narrowing of health disparities and mortality outcomes (Lauderdale 2001).

Race/ethnic inequalities in educational attainment within the United States may be especially sensitive to such factors as language (Fligstein and Fernandez 1985; Rong and Grant, 1992), school location and quality (Karen 2002; Rumbaut 1995), peer networks and the academic performance of friends (South et al. 2007), family structure and parent's expectations about academic performance (Glick and White 2003a, 2003b), and parent's education (Haveman et al. 1991). Furthermore, economic and political conditions in migrant-sending countries affect the educational composition of migrant populations (Massey 1999; Rumbaut 1997).

Additional research should highlight variation within the broad race/ethnic Asian American category. For example, Kauffman (2004) found that compared to second generation U.S.-born Chinese Americans, Chinese immigrants are more likely to make substantial investments in education. NHIS has recently ascertained information on Asian subpopulations, including Chinese, Filipino, Asian Indian, and other Asian Pacific Islanders that may be incorporated into future research on this topic. And while the NHIS data do not contain information on educational quality – and are not designed for such a purpose – they do provide very useful, large annual samples of U.S. adults, making them a valuable tool for large-scale detailed investigations of trends and differentials in educational attainment in U.S. society.

Educational attainment varies by age, sex, race/ethnicity, and nativity and has an

enormous impact on access to physical and psychological resources (Link and Phelan 1995). Our findings underscore the importance of understanding trends in educational attainment in a diverse population and gain additional salience for researchers and policymakers because education is a fundamental cause of health and longevity and significantly influences life choices and opportunities in contemporary U.S. society.

References

- Bae, Yupin, Susan Choy, Clair Geddes, Jennifer Sable, and Thomas Snyder. *Trends in Educational Equity of Girls and Women*. National Center for Education Statistics. Washington, DC: USGPO.
- Borjas, George J. 1991. "Immigration and Self-Selection." Pp. 29-76 in *Immigration, Trade, and the Labor Market*, edited by John M. Abowd and Richard B. Freeman. Chicago, IL: University of Chicago Press.
- Buchmann, Claudia, and Thomas A. DiPrete. 2006. "The Growing Female Advantage in College Completion: The Role of Family Background and Academic Achievement." *American Sociological Review* 71(4):515-41.
- Crimmins, Eileen M. 2005. "Socioeconomic Differentials in Mortality and Health at the Older Ages." *Genus* LXI(1):163-177.
- DiPrete Thomas A., and Claudia Buchmann. 2006. "Gender-Specific Trends in the Value of Education and the Emerging Gender Gap in College Completion." *Demography* 43(1):1-24.
- Feliciano, Cynthia. 2005. "Educational Selectivity in U.S. Immigration: How Do Immigrants Compare to Those Left Behind?" *Demography* 42(1):131-152.
- Fligstein, Neil, and Roberto M. Fernandez. 1985. "Educational Transitions of Whites and Mexican Americans." Pp. 161-92 in *Hispanics in the U.S. Economy*, edited by George J. Bojas and Marta Tienda. NY: Academic Press.
- Freeman, Catherine A. 2004. *Trends in Educational Equity of Girls and Women: 2004*. National Center for Education Statistics (NCHS 2005-016). Washington, DC: USGPO.
- Glick, Jennifer E., and Michael J. White. 2003a. "The Academic Trajectories of Immigrant

- Youths: Analysis Within and Across Cohorts.” *Demography* 40(4):759-83.
- , 2003b. “Post-Secondary School Participation of Immigrant and Native Youth.” *Social Science Research* 33: 272-99.
- Haveman, Robert, Barbara L. Wolfe, and James Spaulding. 1991. “Educational Achievement and Childhood Events and Circumstances.” *Demography* 28:133-58.
- Hudson, Lisa, Sally Aquilino, and Greg Kienzl. 2005. “Postsecondary Participation Rates by Sex and Race/Ethnicity: 1974-2003.” *Education Statistics Quarterly* 7(1). Washington DC: National Center for Education Statistics.
- Hummer, Robert A., Richard G. Rogers, and Isaac E. Eberstein. 1998. “Sociodemographic Differentials in Adult Mortality: A Review of Analytic Approaches.” *Population and Development Review* 24: 553-78.
- Karen, David. 2002. “Changes in Access to Higher Education in the United States: 1980-1992.” *Sociology of Education* 75(3):191-210.
- Kaufman, Julia. 2004. “The Interplay between Social and Cultural Determinants of School Effort and Success: An Investigation of Chinese Immigrant and Second-Generation Chinese Students’ Perceptions Toward School.” *Social Science Quarterly* 85(5):1275-98.
- Korn, Edward L., and Barry I. Graubard. 1999. *Analysis of Health Surveys*. New York: Wiley.
- Lauderdale, Diane S. 2001. “Education and Survival: Birth Cohort, Period, and Age Effects.” *Demography* 38(4):551-61.
- Link, Bruce G., and Jo C. Phelan. 1995. “Social Conditions as Fundamental Cause of Disease.” *Journal of Health and Social Behavior* 35:80-94.
- Lochner, Lance, and Enrico Moretti. 2004. “The Effect of Education on Crime: Evidence from Prison Inmates, Arrests, and Self-Reports.” *American Economic Review* 94(1):155-89.

- Long, Larry H. 1973. "Migration Differentials by Education and Occupation-Trends and Variations." *Demography* 10:243-58.
- Martin, Teresa Castro, and Larry L. Bumpass. 1989. "Recent Trends in Marital Disruption." *Demography* 26:37-51.
- Massey, Douglas S. 1999. "Why Does Immigration Occur? A Theoretical Synthesis." Pp. 34-52 in *Handbook of International Migration*, edited by Charles Hirschman, Josh Dewind, and Philip Kasinitz. New York: Russell Sage Foundation.
- Mirowsky, John, and Catherine E. Ross. 1998. "Education, Personal Control, Lifestyle and Health: A Human Capital Hypothesis." *Research on Aging* 20(4):415-49.
- National Center for Health Statistics. 2002. NHIS Survey Description, National Health Interview Survey, 1999 (machine readable documentation). National Center for Health Statistics, Hyattsville, Maryland.
- Perreira, Krista M., Kathleen Mullan Harris, and Dohoon Lee. 2006. "Making It in America: High School Completion by Immigrant and Native Youth." *Demography* 43(3):511-36.
- Peter, Katherine, Laura Horn, and C. Dennis Carroll. 2005. *Gender Differences in Participation and Completion of Undergraduate Education and How They Have Changed Over Time*. National Center for Education Statistics (NCES 2006-169). Washington DC: USGPO.
- Pettit, Becky, and Bruce Western. 2004. "Mass Imprisonment and the Life Course: Race and Class Inequality in U.S. Incarceration." *American Sociological Review* 69:151-69.
- Rindfuss, Ronald R., S. Philip Morgan, and Kate Offutt. 1996. "Education and the Changing Age Pattern of American Fertility: 1963-1989." *Demography* 33:277-90.
- Rogers, Richard G., Robert A. Hummer, and Charles B. Nam. 2000. *Living and Dying in the USA: Behavioral, Health, and Social Differentials of Adult Mortality*. New York:

Academic.

- Rong, Xue Lan, and Linda Grant. 1992. "Ethnicity, Generation, and School Attainment of Asians, Hispanics, and Non-Hispanic Whites." *Sociological Quarterly* 33:625-36.
- Rumbaut, Ruben G. 1995. "The New Californians: Comparative Research Findings on the Educational Progress of Immigrant Children." Pp. 17-70 in *California Immigrant Children: Theory, Research and Implications for Educational Policy*, edited by Ruben G. Rumbaut and Wayne A. Cornelius. La Jolla: Center for U.S.-Mexican Studies, University of California, San Diego.
- , 1997. "Ties That Bind: Immigration and Immigrant Families in the United States." Pp. 3-46 in *Immigration and the Family: Research and Policy on U.S. Immigrants*, edited by Alan Booth, Ann C. Crouter, and Nancy Landale.. Mahwah, NJ: Lawrence Erlbaum.
- Smith, James P. 2005. "Unraveling the SES-Health Connection." *Population and Development Review* 31(supplement): 108-132.
- South, Scott J., Dana L. Haynie, and Sunita Bose. 2007. "Student Mobility and School Dropout." *Social Science Research* 36(1):68-94.
- StataCorp. 2005. *Stata Statistical Software: Release 9*. College Station, TX: StataCorp LP.
- U.S. Census Bureau. 2001. "Profile of the Foreign-Born Population in the United States: 2000." *Current Population Reports*, Series P23-206. Washington, DC: USGPO.
- Ventura, Stephanie J. 1995. "Births to Unmarried Mothers: United States, 1980-92." *Vital Health Statistics* 53:1-55.
- Wojtkiewicz, Roger A., and Katharine M. Donato. 1995. "Hispanic Educational Attainment: The Effect of Family Background and Nativity." *Social Forces* 74(2):559-74.

TABLE 1

Weighted Mean Years of Educational Attainment by Race/Ethnicity,
Sex, and Nativity, Select Age Groups, 1989-2005

	U.S.-born			Foreign-born		
	25-44	45-64	65+	25-44	45-64	65+
White						
Male	13.65	13.56	12.18	14.75	14.53	12.74
Female	13.68	13.17	11.74	14.31	13.60	11.42
Black						
Male	12.77	12.01	9.55	13.65	13.38	11.38
Female	12.87	12.25	10.08	13.27	12.65	9.96
Asian						
Male	14.63	14.17	12.22	15.42	14.81	13.13
Female	14.00	12.78	10.51	14.68	13.10	9.88
Native Amer.						
Male	12.36	11.80	9.62	---	---	---
Female	12.46	11.77	9.90	---	---	---
Mexican						
Male	10.87	10.25	7.97	9.04	7.45	5.25
Female	11.05	9.94	7.30	9.22	7.13	5.15
Puerto Rican						
Male	12.40	11.20	9.15	11.92	10.88	8.63
Female	12.28	10.53	8.22	12.36	10.87	8.06
Cuban						
Male	13.28	11.36	10.68	12.86	12.37	10.28
Female	13.39	11.34	9.16	13.37	11.97	9.74

Note: Foreign-born Native Americans are excluded because of small sample sizes.

Source: Derived from NHIS, various years.

TABLE 2

Coefficients for Demographic Covariates Predicting Educational Attainment
by Age Group, U.S. Adults Aged 25 and Over, 1989-2005

		Model 1 25-44	Model 2 45-64	Model 3 65+
First order terms				
Male (=1)	β_{x_1}	0.14 ***	0.47 ***	0.10 **
Black (white is ref)	β_{x_2}	-0.70 ***	-1.10 ***	-2.00 ***
Asian	β_{x_3}	0.14	-0.44 ***	-1.78 ***
Native American	β_{x_4}	-1.08 ***	-1.70 ***	-2.18 **
Mexican American	β_{x_5}	-3.49 ***	-4.30 ***	-5.24 ***
Puerto Rican	β_{x_6}	-1.55 ***	-3.58 ***	-4.56 ***
Cuban	β_{x_7}	-0.54 ***	-1.94 ***	-2.08 ***
Foreign born (=1)	β_{x_8}	0.45 ***	0.10	-0.62 ***
Calendar Year	β_{x_9}	0.04 ***	0.07 ***	0.08 ***
Second order interactions				
Male*Year	$\beta_{x_1 * x_9}$	-0.02 ***	-0.01 ***	0.03 ***
Male*Black	$\beta_{x_1 * x_2}$	-0.08 ***	0.62 ***	-0.93 ***
Male*Asian	$\beta_{x_1 * x_3}$	0.60 ***	0.91 ***	1.41 ***
Male*Native Amer.	$\beta_{x_1 * x_4}$	-0.07	-0.09 *	-0.72 *
Male*Mexican Amer.	$\beta_{x_1 * x_5}$	-0.17 ***	-0.09	0.28 *
Male*Puerto Rican	$\beta_{x_1 * x_6}$	0.12	0.22	0.48
Male*Cuban	$\beta_{x_1 * x_7}$	-0.14	-0.40 *	1.17 **
Year*Black	$\beta_{x_9 * x_2}$	-0.01 **	0.02 *	0.04 **
Year*Asian	$\beta_{x_9 * x_3}$	0.05 ***	0.05 **	0.09 ***
Year*Native Amer.	$\beta_{x_9 * x_4}$	-0.02	0.04	0.05
Year*Mexican	$\beta_{x_9 * x_5}$	0.13 ***	0.14 ***	0.08 ***
Year*Puerto Rican	$\beta_{x_9 * x_6}$	0.03 *	0.16 ***	0.19 ***
Year*Cuban	$\beta_{x_9 * x_7}$	0.06 ***	0.11 ***	-0.07
Foreign born*Male	$\beta_{x_8 * x_1}$	0.58 ***	0.55 ***	0.79 ***
Foreign born*Black	$\beta_{x_8 * x_2}$	-0.17	-0.22	-0.16
Foreign born*Asian	$\beta_{x_8 * x_3}$	-0.40 ***	-0.66 ***	-1.00 **
Foreign born*Native Amer.	$\beta_{x_8 * x_4}$	NA	NA	NA
Foreign born*Mexican	$\beta_{x_8 * x_5}$	-3.26 ***	-4.09 ***	-2.21 ***
Foreign born*Puerto Rican	$\beta_{x_8 * x_6}$	-0.73 ***	-1.07 ***	-1.30 **
Foreign born*Cuban	$\beta_{x_8 * x_7}$	-1.11 ***	-0.99 **	1.14 **
Third order interactions				
Foreign born*Male*Black	$\beta_{x_8 * x_1 * x_2}$	0.01	0.46 *	1.06 *
Foreign born*Male*Asian	$\beta_{x_8 * x_1 * x_3}$	-0.30 *	-0.14	0.48
Foreign born*Male*Native Amer.	$\beta_{x_8 * x_1 * x_4}$	NA	NA	NA
Foreign born*Male*Mexican	$\beta_{x_8 * x_1 * x_5}$	-0.45 ***	-0.49 **	-1.52 ***
Foreign born*Male*Puerto Rican	$\beta_{x_8 * x_1 * x_6}$	-0.98 ***	-1.11 ***	-1.34 **
Foreign born*Male*Cuban	$\beta_{x_8 * x_1 * x_7}$	-0.79 ***	-0.10	-1.94 ***
Control variables				
Age	$\beta_{x_{10}}$	0.10 ***	0.26 ***	-0.27 *
Age-squared	$\beta_{x_{11}}$	-0.02 ***	-0.05 ***	0.00
Education question change (=1)	$\beta_{x_{12}}$	-0.07 *	0.09 *	-0.05
Intercept	α	13.26 ***	12.86 ***	14.55 ***
R²		0.12	0.12	0.11

* $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$ (two-tailed tests)

Note: Foreign-born Native Americans are excluded because of small sample sizes.

Source: Derived from NHIS, various years.

TABLE 3

Estimated Educational Attainment Levels, U.S. Adults Ages 25-44, 1989-2005

	White	Black	Asian	Native Amer.	Mexican	Puerto Rican	Cuban
Panel A: U.S.-born							
1989							
Men	13.47	12.68	14.14	12.32	9.81	12.04	12.79
Women	13.33	12.63	13.40	12.25	9.84	11.78	12.79
1995							
Men	13.59	12.80	14.56	12.32	10.71	12.34	13.27
Women	13.50	12.81	13.94	12.44	10.86	12.20	13.39
2000							
Men	13.69	12.90	14.91	12.32	11.46	12.59	13.67
Women	13.70	12.96	14.39	12.59	11.71	12.55	13.89
2005							
Men	13.79	13.00	15.26	12.59	12.21	12.84	14.07
Women	13.97	13.11	14.84	12.74	12.56	12.90	14.39
Δ 2005-1989							
Men	0.32	0.32	1.12	0.27	2.40	0.80	1.28
Women	0.64	0.48	1.44	0.49	2.72	1.12	1.60
Panel B: Foreign-born							
1989							
Men	14.50	13.55	14.54	---	7.13	11.36	11.92
Women	13.78	12.91	13.52	---	7.03	11.50	12.13
1995							
Men	14.62	13.67	14.96	---	8.03	11.66	12.40
Women	14.02	13.09	14.06	---	8.05	11.92	12.73
2000							
Men	14.72	13.77	15.31	--	8.78	11.91	12.80
Women	14.22	13.24	14.51	---	8.90	12.27	13.23
2005							
Men	14.82	13.87	15.66	---	9.53	12.16	13.20
Women	14.42	13.39	14.96	---	9.75	12.62	13.73
Δ 2005-1989							
Men	0.32	0.32	1.12	---	2.40	0.80	1.28
Women	0.64	0.48	1.44	---	2.72	1.12	1.60

Note: Foreign-born Native Americans are excluded because of small sample sizes.

Source: Derived from Table 2, Model 1.

TABLE 4

Estimated Educational Attainment Levels, U.S. Adults Ages 45-64, 1989-2005

	White	Black	Asian	Native Amer.	Mexican	Puerto Rican	Cuban
Panel A: U.S.-born							
1989							
Men	12.93	12.45	13.40	11.14	8.54	9.57	11.21
Women	12.50	11.83	12.06	10.80	8.63	8.92	10.56
1995							
Men	13.35	12.99	14.12	11.80	9.80	10.95	12.29
Women	13.04	12.37	12.90	11.64	9.89	10.42	11.76
2000							
Men	13.70	13.44	14.72	12.35	10.85	12.10	13.19
Women	13.49	12.82	13.60	12.34	10.94	11.67	12.76
2005							
Men	14.41	14.25	15.68	13.26	12.26	13.61	14.45
Women	13.94	13.63	14.30	13.04	12.35	12.92	13.76
Δ 2005-1989							
Men	1.48	1.80	2.28	2.12	3.72	4.04	3.24
Women	1.44	1.80	2.24	2.24	3.72	4.00	3.20
Panel B: Foreign-born							
1989							
Men	13.58	13.34	13.25	---	4.61	8.04	10.77
Women	12.60	11.71	11.50	---	4.64	7.95	9.67
1995							
Men	14.00	13.88	13.97	---	5.87	9.42	11.85
Women	13.14	12.25	12.34	---	5.90	9.45	10.87
2000							
Men	14.35	14.33	14.57	---	6.92	10.57	12.75
Women	13.59	12.70	13.04	---	6.95	10.70	11.87
2005							
Men	15.06	15.14	15.53	---	8.33	12.08	14.01
Women	14.04	13.51	13.74	---	8.36	11.95	12.87
Δ 2005-1989							
Men	1.48	1.80	2.28	---	3.72	4.04	3.24
Women	1.44	1.80	2.24	---	3.72	4.00	3.20

Note: Foreign-born Native Americans are excluded because of small sample sizes.

Source: Derived from Table 2, Model 2.

TABLE 5

Estimated Educational Attainment Levels, U.S. Adults Ages 65 and Over, 1989-2005

	White	Black	Asian	Native Amer.	Mexican	Puerto Rican	Cuban
Panel A: U.S.-born							
1989							
Men	12.07	9.14	11.70	9.17	7.11	7.99	11.16
Women	11.97	9.97	10.19	9.79	6.73	7.41	9.89
1995							
Men	12.73	10.04	12.90	10.13	8.25	9.79	11.40
Women	12.45	10.69	11.21	10.57	7.69	9.03	9.95
2000							
Men	13.28	10.79	13.90	10.93	9.20	11.29	11.60
Women	12.85	11.29	12.06	11.22	8.49	10.38	10.00
2005							
Men	13.83	11.54	14.90	11.73	10.15	12.79	11.80
Women	13.25	11.89	12.91	11.87	9.29	11.73	10.05
Δ 2005-1989							
Men	1.76	2.40	3.20	2.56	3.04	4.80	0.64
Women	1.28	1.92	2.72	2.08	2.56	4.32	0.16
Panel B: Foreign-born							
1989							
Men	12.24	10.21	11.35	---	6.13	8.10	10.53
Women	11.35	9.19	8.57	---	6.48	8.07	10.41
1995							
Men	12.90	11.11	12.55	---	7.27	9.90	10.77
Women	11.75	9.91	9.59	---	7.44	9.69	10.47
2000							
Men	13.45	11.86	13.55	---	8.22	11.40	10.97
Women	12.23	10.51	10.44	---	8.24	11.04	10.52
2005							
Men	14.00	12.61	14.55	---	9.17	12.90	11.17
Women	12.63	11.11	11.29	---	9.04	12.39	10.57
Δ 2005-1989							
Men	1.76	2.40	3.20	---	3.04	4.80	0.64
Women	1.28	1.92	2.72	---	2.56	4.32	0.16

Note: Foreign-born Native Americans are excluded because of small sample sizes.

Source: Derived from Table 2, Model 3.