Principal Indicators of Student Academic Histories in Postsecondary Education, 1972-2000

U.S. Department of Education • Institute of Education Sciences

Principal Indicators of Student Academic Histories in Postsecondary Education, 1972-2000

Clifford Adelman
Senior Research Analyst
Institute of Education Sciences

U.S. Department of Education
Rod Paige
Secretary

Institute of Education Sciences
Grover J. Whitehurst
Director

January 2004

Suggested Citation
Adelman, C. 2004. *Principal Indicators of Student Academic Histories in Postsecondary Education, 1972-2000*. Washington, DC: U.S. Department of Education, Institute of Education Sciences.

Executive Summary

Principal Indicators is a descriptive account of the major features of the postsecondary academic experience and attainment of traditional-age students during the period 1972–2000, with an emphasis on the period 1992–2000. To provide this account, the report draws on three grade-cohort longitudinal studies that were designed and carried out by the National Center for Education Statistics, and within those studies, high school and (principally) college transcript records:

- The National Longitudinal Study of the High School Class of 1972 (NLS:72), which began with a national sample of 22,500 12th graders in U.S. high schools in the spring of 1972 and followed subgroups of the cohort to 1986. The postsecondary transcripts for 12,600 members of this cohort were gathered in 1984, when most were 30 or 31 years old.

- The High School and Beyond Longitudinal Study of 1980 Sophomores (HS&B/So:80-92), which began with a national sample of 30,000 10th graders in U.S. high schools in 1980 and followed subgroups of this cohort to 1992. The postsecondary transcripts for 8,400 members of this cohort were gathered in 1993, when most cohort members were 29 or 30 years old.

- The National Education Longitudinal Study of 1988 (NELS:88/2000), which began with a national sample of 25,000 8th graders in U.S. schools in 1988 and followed subgroups of this cohort to 2000. The postsecondary transcripts for 8,900 members of this cohort were gathered in 2000, when most cohort members were 26 or 27 years old. More than half the tables in *Principal Indicators* are confined to the history of this—the most recent—cohort.

To provide consistency in comparing the experience of students in the three cohorts, the populations used for the data tables in *Principal Indicators* are confined to those students who were in the 12th grade in the year they were scheduled to graduate from high school. This parameter was determined by the earliest of the grade cohorts, NLS:72, which began in the 12th grade. Hence, the three cohorts are referred to throughout the document as

- the high school class of 1972,
- the high school class of 1982, and
- the high school class of 1992.

By confining the universe to 12th graders, high school dropouts who had not returned to be with their scheduled class and early graduates are excluded from this account of the postsecondary histories of the classes of 1982 and 1992.

The tables in *Principal Indicators* cover topics of geographic mobility, postsecondary access and degree of participation, postsecondary attainment (degrees, credits, time-to-degree), attendance patterns, majors, curriculum clusters, grades, and remediation. A companion document—*The Empirical Curriculum: Changes in Postsecondary Course-Taking, 1972–2000*—provides a more detailed account of the curricular experience of the three grade cohorts.

Major Topics and Illustrative Observations

Demography and Geography

One of the more important changes in the behavior of postsecondary student populations over the past quarter century is geographic and inter-institutional mobility. When students move from institution to institution and state to state in the course of their undergraduate careers, they create a very different dynamic for analyses of persistence and degree completion.

- The proportion of postsecondary students from second-language backgrounds doubled (from 5 to 10 percent) between the high school classes of 1982 and 1992 (table 1.3).
- A higher proportion of postsecondary students in the high school class of 1992 came from high schools in the five Southern and Western census divisions than was the case for the high school class of 1982 (table 1.2).
- One out of 10 bachelor's degree recipients in the high school class of 1992 earned the degree in a state other than the state in which they began their college careers (table 1.6).
- Nearly 40 percent of bachelor's degree recipients in the high school class of 1992 later resided in a state other than the state in which they received their degree (table 1.7).

Postsecondary Attainment, Access, and Participation

Given the increasing proportion of traditional-age students continuing on to postsecondary education after high school, policy discussions and research have come to be dominated more by issues of retention, persistence, completion, and time-to-degree than by basic access.

- The bachelor's degree attainment rate for all students who earned more than 10 postsecondary credits was in the range of 45–49 percent over the history of the three cohorts (table 2.1).
- The bachelor's degree attainment rate for all students who earned any credits from a bachelor's degree granting institution was 66–67 percent over the history of the three cohorts (table 2.2).
- Average elapsed time-to-degree for those who earned bachelor's degrees within 8.5 years of high school graduation in the class of 1992 was 4.56 calendar years, compared with 4.45 years for the comparable group in the class of 1982 and 4.34 years for the comparable group in the class of 1972. (table 2.3).
- Seventy-seven percent of the high school class of 1992 attended at least one postsecondary institution within 8.5 years of scheduled high school graduation. This

access rate compares with 63 percent for the class of 1982 over an 11-year period, and 58 percent for the class of 1972 over a 12-year period. The gaps in access between the highest and lowest socioeconomic status quintiles over the three cohorts are more pronounced than those by race/ethnicity (table 2.4).

- When the universe is confined to students in the class of 1992 who earned standard high school diplomas within a year of scheduled graduation, the differences in access rates between White and both African-American and Latino students are statistically insignificant (table 2.7) while differences by socioeconomic status quintile remain (table 2.8).

Attendance Patterns

An examination of attendance patterns reveals increasing complex configurations, but also enables analysts to sort out distinct groups of students to target either for enhanced precollegiate preparation or special guidance in postsecondary institutions. Understanding these patterns is particularly important for enrollment management at the state system and institutional levels.

- One out of eight students in the class of 1992 who entered postsecondary education became an "incidental" student, that is, earned 10 or fewer credits and no credentials (table 3.1). Over 40 percent of these students delayed entry to postsecondary education (compared with 15 percent of nonincidental students); 75 percent started out in a community college (compared with 36 percent of nonincidental students); two out of three were enrolled for less than1 year; and 42 percent never got beyond Algebra 1 in high school (vs. 11 percent of nonincidental students) (table 3.2).
- One out of 10 students in the class of 1992 who entered postsecondary education earned 60 or more credits but no degree within 8.5 years of high school graduation. There were no differences by race/ethnicity in this group, although men were more likely than women to fall into this category (table 3.1). When compared to their peers who earned associate's and/or bachelor's degrees, this group was characterized more by noncontinuous enrollment, multi-institutional attendance, a higher proportion of courses from which they withdrew, and a low number of credits earned in the first calendar year of postsecondary attendance (table 3.3).
- Eighty-eight percent of the students from the class of 1992 who entered postsecondary education persisted from their first to second year. Among those who did not persist, two-thirds started in community colleges and 70 percent earned less than 10 credits in their first calendar year of attendance (table 3.4).
- Fifty-seven percent of students in the class of 1992 who earned more than 10 credits attended more than one school as undergraduates, compared with 51 percent for the class of 1982 and 47 percent for the class of 1972. Among those who earned bachelor's degrees, nearly 60 percent attended more than one school as undergraduates in the class of 1992, 58 percent in the class of 1982, and 57 percent in the class of 1972 (table 4.1).
- Among those in the class of 1992 who started in a 4-year college and earned a bachelor's degree, one out of five earned the degree from an institution other than the one in which they began their postsecondary careers (table 1.6).

- Of all students who began their postsecondary careers in community colleges and earned more than 10 credits from community colleges, 36 percent of those in the class of 1992 formally transferred to a 4-year college, compared with 27 percent in the class of 1982 and 28 percent for the class of 1972. Of these transfer populations, the bachelor's degree attainment rate was 72 percent for the 11- and 12-year histories of the classes of 1972 and 1982 and 62 percent for the 8.5-year history of the class of 1992 (table 4.4).
- Twenty-seven percent of African-American college students in the class of 1992 attended one of the Historically Black Colleges and Universities (HBCUs) at some time in their undergraduate careers (table 4.5).
- Forty-eight percent of Latino college students in the class of 1992 attended a Hispanic Serving Institution (HSI) at some time in their undergraduate careers. Nearly two-thirds of Latino students who attended HSIs started in a 2-year HSI (table 4.6).
- Nineteen percent of postsecondary participants in the class of 1992 earned college credits while still enrolled in high school and/or by examination. For bachelor's degree recipients with no such acceleration credits, the average time-to-degree was 4.65 calendar years; for those with more than 9 acceleration credits, the average time-to-degree was 4.25 calendar years (table 4.7).

Majors and Curriculum

The knowledge and skills students bring to the labor market and community life derive, in considerable part, from what they study in their postsecondary careers. Choices of majors among traditional-age students have been volatile, and changes in majors among minority students have defied conventional wisdom. The extent of student participation in specific areas of the curriculum reveals the increased importance and benefits of academic momentum emanating from secondary school experience.

- The proportion of all students earning bachelor's degrees in business and allied fields rose from 17 percent in the 1970s to 25 percent in the 1980s, then fell back to 17 percent in the 1990s (table 5.1).
- Conversely, the proportion of all students earning bachelor's degrees in education fell from 16 percent in the 1970s to 6 percent in the 1980s, then rebounded to 9 percent in the 1990s (table 5.1).
- Among African-American bachelor's degree recipients, the proportion earning degrees in engineering in the class of 1992 (12.6 percent) was nearly double that for the class of 1982 and six times that for the class of 1972. Conversely, the proportion of African-American bachelor's degree recipients earning degrees in education fell from 22 percent in the 1970s to 6 percent in the 1980s and 1990s (table 5.2).
- The proportion of Asian-American bachelor's degree recipients majoring in engineering fell from 20 percent in the class of 1982 to 11 percent in the class of 1992 (table 5.2).
- With the exception of engineering among men and elementary education among women (where the differences were not statistically significant), psychology was the most popular major among bachelor's degree recipients of the class of 1992, claiming 10

percent of female bachelor's degrees, 5 percent of male bachelor's degrees, and 8 percent of all bachelor's degrees (table 5.3).

- Of community college students who earned associate's degrees, the proportion who earned those degrees in General Studies (the classic transfer curriculum) fell from 39 percent for the class of 1972 to 30 percent for the class of 1982, but rose to 43 percent for the class of 1992 (table 5.4).
- The proportion of women earning associate's degrees from community colleges in health sciences and services ranged between five and eight times that for men in all three cohorts. Conversely, the proportion of men earning associate's degrees from community colleges in engineering technology and other technical fields ranged between five and eight times that for women in all three cohorts (table 5.4).
- Among students who earned more than 30 credits and those who earned bachelor's degrees, there was no significant difference between the class of 1982 and the class of 1992 in the proportion earning any credits in calculus and advanced mathematics (table 5.5).
- One of the reasons there was no significant difference in the proportion of bachelor's degree recipients earning postsecondary credits in calculus and advanced mathematics between the class of 1982 and the class of 1992 may be that 23 percent of this group in the class of 1992 had already completed calculus courses in high school, compared with 15 percent for the class of 1982 (table 5.6).

Grades and Grading

While grades provide no information about what students have actually learned, they are the most accessible indicators of undergraduate academic performance, and are often subject to intense public arguments about whether students are being judged more leniently than in the past.
To help put these arguments in perspective, the national transcript samples show that

- Average postsecondary grade point averages (GPAs) for women and those who earned bachelor's degrees fell from the 1970s to the 1980s, then rose back to at least previous levels in the 1990s (table 6.1).
- The most notable change in the distribution of letter grades over the history of the three cohorts is the rise (from 4 percent for the class of 1972 to over 8 percent for the class of 1992) in the proportion of grades that were no-penalty Withdrawals (Ws) and No-Credit Repeats (NCRs) (table 6.1). Of all grades given in open door institutions (including community colleges), the proportion that were Ws and NCRs rose from 12 to 16 percent between the histories of the classes of 1982 and 1992 (table 6.3).
- For the class of 1992, the higher the number of grades of W and NCR on students' records, the lower the percentage of students who earned bachelor's degrees. For those with no Ws or NCRs, the bachelor's degree attainment rate was 68 percent; for those with 7 or more Ws and NCRs, the bachelor's degree attainment rate was 25 percent (table 6.2a).

- Among bachelor's degree recipients in the class of 1992, those with no W or NCR grades completed their degrees in an average of 4.14 calendar years. With one or two grades of W and/or NCR, the average time-to-degree jumped to 4.45 calendar years, and with 7 or more Ws and NCRs, to 5.97 calendar years (table 6.2).
- In two of the three cohorts, students earning bachelor's degrees from highly selective institutions had higher undergraduate GPAs than those who earned degrees from selective institutions, and these students, in turn, had higher GPAs than students who earned degrees from nonselective institutions (table 6.4).
- The list of courses with the highest percentages of failures (penalty grades, Ws, and NCRs) is dominated by remedial English and precollegiate mathematics, other mathematics, introductory-level business and accounting, and major lower-division distribution courses such as U.S. history surveys, computer programming, general psychology, and introduction to fine arts (tables 6.6 and 6.7).

Remediation in Postsecondary Contexts

Remediation receives separate and special treatment because it sheds light on the interaction between secondary and postsecondary systems and on policy actions concerning the financing of education and the routing of underprepared students to community colleges. The presentation in *Principal Indicators* highlights not only the amount but the types of remediation at issue.

- The proportion of all students who took at least one remedial course dropped from 51 percent in the class of 1982 to 42 percent in the class of 1992. This decline took place principally for students who started in 4-year colleges, where the remediation rate fell from 44 to 26 percent. At the same time, the proportion of students starting in community colleges who required at least one remedial course showed no significant change, remaining in the 61–63 percent range (table 7.1).
- The proportion of students requiring remediation in reading was 11 percent in both the class of 1982 and the class of 1992 (table 7.1). Remedial reading was the only one of five types or intensities of remediation that was directly related to senior-year test score quintile in both cohorts (table 7.2); and the proportion of students requiring remedial reading who earned no postsecondary credentials rose from 57 to 70 percent (table 7.3).

Acknowledgments

Special thanks to the American Association of Collegiate Registrars and Admissions Officers for hosting the year-long process of data entry for the NELS postsecondary transcripts; to Tracy Hunt-White of the National Center for Education Statistics for assistance in line-by-line reading of student records, on-line catalogue searches, and serving as the second judge in the creation of hand-and-eye variables; to T. R. Curtin of Research Triangle Institute for cooperation, patience, and skill in managing the process of NELS transcript collection and creation of special weights for NCES; to both Ilona Berkovits, formerly of the National Center for Education Statistics, and Bruce Daniel of Pinkerton Computer Consulting for helping make the NELS transcript file accurate and clear; and mostly to Jeffrey Owings of the National Center for Education Statistics for shepherding the NELS project to completion.

Appreciation is also extended to the Office of Vocational and Adult Education of the U.S. Department of Education, the division of Science Resource Statistics of the National Science Foundation, the College Board, the Education Commission of the States, the American College Testing Service, the State Higher Education Executive Officers Network, the Association for Institutional Research, the American Association of Colleges and Universities, the Spencer Foundation, and the Mellon Foundation for providing indirect assistance, advice, and/or forums at which the frameworks and coding rules for the postsecondary transcript files could be tested as they were being constructed.

For review of the early drafts of *Principal Indicators*, the author is deeply grateful to Prof. Alberto Cabrera of the University of Wisconsin-Madison, Prof. Steven DeJardins of the University of Michigan, Mary Golladay of the Division of Science Resource Statistics of the National Science Foundation, Jacqueline King of the American Council on Education, Kent Phillippe of the American Association of Community Colleges, and most of all to C. Dennis Carroll and Paula Knepper of the National Center for Education Statistics.

The comments and suggestions of 30 external reviewers in 6 panels during the formative stages of the NELS postsecondary transcript file construction are gratefully acknowledged. With institutional affiliation at the time of their service, they were:

Ashok Agrawal	St. Louis Community College
Luz Barreras	New Mexico Institute of Mining and Technology
Mildred Boyd	Greater Baltimore Advanced Technology Center
May K.C. Chen	Los Angeles Trade-Technical College
Jerald Dallam	University of Iowa
Arthur Ellis	University of Wisconsin-Madison
Dwaine Eubanks	Clemson University
Thomas Gething	National Foreign Language Center
Carmine Gibaldi	St. Johns University (NY)
Ross Gittell	University of New Hampshire
Lloyd Griffiths	George Mason University

Michael Harsh	Hagerstown Community College
Douglas Hesse	Illinois State University
Richard Hendrix	University of Pennsylvania
Janet Holdsworth	University of Minnesota
William Kelly	Catholic University of America
William Keyhoe	University of Virginia
William Lauffer	Prince George's Community College
Dennis Lehman	Harold Washington College (IL)
Paul Lennard	Emory University
Katherine Lewis	Brown University
Jose Mestre	University of Massachusetts-Amherst
Myrtle Mitchell	Seattle Central Community College
James Mortensen	Pennsylvania State University
Linda Pratt	University of Nebraska
Gene Scheiber	Kansas City-Metro Community College
Eric Sheppard	National Science Foundation
Jerry Smith	University of Texas-Arlington
Jane Voos	William Paterson University (NJ)
John Weese	Texas A&M University

Contents

List of Tables and Figures

Table Number **Page**

Table Number **Page**

Part 5: Majors and Curriculum

Table Number **Page**

Appendix D

Figure Number **Page**

The Nature of This Document

Principal Indicators is a presentation of data informing important questions that have been asked by state legislatures, the Congress, the media, and the general public concerning postsecondary student access, attainment, attendance patterns, curriculum participation, and academic performance over the past quarter century. These topics are the major components of undergraduate student academic history.

The data are derived mostly from the postsecondary transcript files of three overlapping grade-cohort longitudinal studies designed and conducted by the National Center for Education Statistics:

- National Longitudinal Study of the High School Class of 1972 (NLS:72/86). The data span 1972–1986.
- High School & Beyond Longitudinal Study of 1980 Sophomores (HS&B-So:80/92). The data span 1980–1993.
- National Education Longitudinal Study of 1988 (NELS:88/2000). The data span 1988–2000.

The topics and tables in *Principal Indicators* are successors to those in Part I of *The New College Course Map and Transcript Files* (Adelman 1999a), which covered only the first two of the above longitudinal studies cohorts, and did so in less detail. With the recent release of the NELS:88/2000 postsecondary transcript files, more contemporary data are available, and analysts can begin to construct comparative trends covering the histories of students as they made their way into and through postsecondary education from their high school years through their late twenties.

What *Principal Indicators* does is simply to arrange and set forth the data, introduce the topics, provide pointers for reading the tables along with selected observations on statistical significance and potential connections to policy issues, and raise questions and hypotheses for further research and investigation.

There are 46 tables in *Principal Indicators*. Twelve of these tables compare performance across all three longitudinal studies cohorts; 9 are confined to comparisons between the HS&B/ Sophomore cohort and the NELS:88/2000; and 25 are derived wholly from NELS:88/2000.

The nature of transcript-based data sets is such that for estimates involving an event with a unique date, for example, the award of a bachelor's degree, the records for all three longitudinal studies can be truncated at a specific moment in time. The time period chosen in those cases is that of the shortest of the longitudinal studies, NELS:88/2000, which extended for 8.5 years beyond the modal high school graduation date of June 1992. For other estimates involving processes that have no clearly identifiable dates, the entire cohort history is used. For example, in presenting the phenomenon of transfer from a community college to a 4-year college, it is impossible to determine precisely when the transfer took place if the student is engaged in

alternating enrollment between the two types of institutions. The transcripts do not tell us when the 4-year college formally recognized the transfer. The estimate is thus of the status of the student at the end of the cohort history. This elasticity of the outermost date is used even though 97.6 percent of the undergraduate course-taking activity in the NLS:72 (a 12-year history) and 96.3 percent of the undergraduate course-taking activity for the HS&B/Sophomore cohort (an 11-year history) took place within the first 8.5 years following the modal high school graduation dates for those cohorts.

Organization of The Report

The order of presentation within *Principal Indicators* is based primarily on the prominence and frequency of the questions in contemporary policy discussions of postsecondary education (exclusive of financial aid). After an introduction that focuses on the mobility of contemporary traditional-age undergraduates, the presentation turns first to the bottom line of degree completion, then follows the story line from access through types of participation, alternative ways of looking at student histories, attendance patterns, majors and curriculum participation, and grades. The presentation concludes with a section on remediation. Remediation is last, not because it is less important, rather because it is a different type of topic that deserves special treatment.

Principal Indicators does not cover all potential topics or configurations of the data that can be drawn from the three longitudinal studies. Its companion volume—*The Empirical Curriculum: Changes in Postsecondary Course-Taking, 1972–2000*—provides much greater detail on the content of postsecondary education, at least in terms of the curriculum as experienced by students (as opposed to the curriculum set forth in college catalogs).

Reading Guide and Technical Keys to Judgment in *Principal Indicators*

The data are presented with Taylor-series standard errors produced by AM, a software program developed by Jon Cohen and colleagues at the American Institutes for Research. The standard errors are critical to judging whether estimates are statistically significant. For a brief guide to the use of standard errors and other technical issues related to the data, please see appendix C.

A few terms have special meanings in *Principal Indicators*. The terms, as defined below, are used throughout this document. The most important of these are

- **True first institution of attendance.** The "true" first institution of attendance excludes (1) colleges and community colleges in which the student was enrolled prior to high school graduation; (2) institutions in which the student was enrolled during the summer immediately following high school graduation and prior to fall term postsecondary entry (unless the institution was the same in both periods); and (3) "false starts," that is, cases in which the student enrolled, but then withdrew during the first term of attendance, only to enroll and complete course work in a different institution at a later point in time (in these cases, the second institution is the "true first institution"). The true first *date* of attendance is the

first month of enrollment at the true first institution. True first institution/date and first institution/date are used interchangeably throughout this document.

- **Likely postsecondary participants.** The universe of *likely* postsecondary participants in the NELS:88/2000 transcript-based files consists of (1) all students for whom at least one in-scope transcript was received (weighted N=1.95m) plus (2) students for whom transcripts were requested but not received (weighted N=115k), yet who met one of the following criteria (in order of selection): (1) loan disbursement records were found in the National Student Direct Loan System (NSDLS) files; (2) in 1994, the student provided an account of the methods used to finance postsecondary education in combination with identifying institutions attended; (3) the student's high school record was equal to or higher than the mean for known 4-year college attendees in class rank/grade point average, academic curriculum intensity, number of Advanced Placement courses, and combined SAT/ACT test scores; (4) the student's account of his/her postsecondary history in 2000 included multi-institutional attendance, simultaneous enrollment, enrollment in 2000, and credential earned; (5) the student's 2000 account of his/her postsecondary history included change of major, full-time/part-time status, and stop-out periods; and, (6) in 2000, the student provided academic, financial, family, or job-related reasons for leaving postsecondary education without earning a credential.

- **Elapsed calendar year versus academic year.** This is an important distinction when talking about how much time it takes students to earn credentials. The traditional academic year, whether semester or quarter calendars, is 9 months. A student who entered college in September 1998 and graduated with a bachelor's degree in June 2002 is said to have earned a "4-year degree" *on time*, no matter when the student was enrolled between those dates, and no matter whether the academic calendar system(s) in the institution(s) in which they were enrolled were semester, quarter, trimester, clock hour, irregular, or some combination of these. Yet the elapsed calendar time between those dates is not 4 years, but 3.75 years. If the student had not received the degree until December 2002, the elapsed time would have been 4.25 calendar years and 4.5 academic years. There is always a .25 difference between the two metrics. This document employs the *elapsed calendar year* as its metric because of the extent of multi-institutional attendance, use of summer terms, accumulation of credits by examination and in special terms with no set parameters such as a semester, and other nonstandard uses of time in postsecondary education.

- **Credits.** All postsecondary credits, including clock hours, have been standardized to a semester metric.

[THIS PAGE IS INTENTIONALLY BLANK]

Part 1:
Background

Principal Indicators is primarily a reference work. Like its companion, *The Empirical Curriculum: Changes in Postsecondary Course-Taking, 1972–2000*, it is designed for use by

- higher education administrators, faculty, and institutional research officers;
- state higher education offices;
- national organizations concerned with education and training after high school;
- researchers who focus on postsecondary education issues; and
- human resource development personnel concerned with the quality of the workforce.

These two documents, and the Web-posted taxonomy of postsecondary courses that accompanies them, are successors to *The New College Course Map and Transcript Files* (U.S. Department of Education, 1995; 2nd edition, 1999), known as the *CCM*. The data for *Principal Indicators* are derived mostly from the postsecondary transcript files of three overlapping grade-cohort longitudinal studies designed and conducted by the National Center for Education Statistics. The three studies are called "grade cohort" studies because each of them began with a nationally representative sample of students in a specific school grade, and followed the same students through high school and into early adulthood. The three studies are:

- National Longitudinal Study of the High School Class of 1972 (NLS:72), which began with a sample of 22,500 12th graders, and followed subpanels of this cohort for 14 years until 1986, when they were 32 or 33 years old. Hereafter, this cohort will be referred to as the **"Class of 1972"** or **"1972 12th graders.**"

- High School & Beyond/Sophomore Cohort (HS&B/So), which began with a sample of over 30,000 10th graders in 1980, and followed subpanels of this cohort for 12 years until 1992, when they were 28 or 29 years old. Hereafter, this cohort will be referred to as the **"Class of 1982"** or **"1982 12th graders,"** the year they were scheduled to graduate from high school.

- National Education Longitudinal Study of 1988 (NELS:88/2000), which began with a sample of 25,000 8th graders in 1988, and followed subpanels of this cohort for 12 years until 2000, when they were 26 or 27 years old. Hereafter, this cohort will be referred to as the **"Class of 1992,"** or **"1992 12th graders**," the year they were scheduled to graduate from high school.

The characteristics of each of these longitudinal studies are described in appendix A. Most important to this document is the fact that all three studies included the collection, coding, and analysis of the postsecondary transcripts of students who reported that they had attended colleges, community colleges, and postsecondary trade schools, as follows:

- For the Class of 1972, the transcripts were collected in 1984, when the students were 30 or 31 years old.

- For the Class of 1982, the transcripts were collected in 1993, when the students were 29 or 30 years old.
- For the Class of 1992, the transcripts were collected in 2000, when the students were 26 or 27 years old.

Given these different transcript collection dates, and the ages of the students at the time of collection, it appears that the longer the history, the greater the opportunity for students to enter, participate, and complete credentials in postsecondary education. Some of the tables presented in Part 2 of this report compare the data from all three cohorts without adjustments. Other tables require a common censoring point for accurate comparison—for example, on the time it took to earn degrees. When a common time frame is required, the shortest of the postsecondary periods in the longitudinal studies, that of the Class of 1992 (8.5 years after the modal high school graduation date) is used.

In addition, all three data sets include high school records (for the Classes of 1982 and 1992, these records are in the form of high school transcript files) and test scores (SAT, ACT, AP, and a special general learned abilities test that was administered to each cohort). In sum, in addition to survey data, each of these data sets includes a considerable amount of "unobtrusive evidence" (Webb et al. 1966) that enables the analyst to construct complex educational histories.

Primary Focus of This Presentation: The High School Class of 1992 (NELS:88/2000)

While all three age-cohort longitudinal studies are used in the presentation of data in *Principal Indicators*, the principal focus of the tables and storylines that follow is on the High School Class of 1992. It is the most recent of the data sets, and its information hence comes closest to shedding light on key topics of current concern in higher education. These topics include time-to-degree, multi-institutional attendance, the extent of participation in postsecondary education by different populations, and potential measures of institutional and system accountability.

While the postsecondary transcript files in all three longitudinal studies were edited by the same individual and reviewed by external faculty and administrative panels following the same procedures and rules, and while the variable definitions and coding systems were held constant, the Class of 1992 data files were constructed in a way that yielded a wider range of information than that found in its two predecessors.

The Class of 1972 (NLS:72) and Class of 1982 (HS&B/Sophomore Cohort) postsecondary transcript files were first built by contractors who then presented electronic files for editing and recoding. For the Class of 1992 (NELS:88/2000), the contractor (Research Triangle Institute) was responsible for the complex process of gathering the transcripts from institutional registrars (see Curtin, Ingels, Wu, and Heuer 2002), but the process of data entry was combined with editorial review and monitored at a secure site by U.S. Department of Education staff. The American Association of Collegiate Registrars and Admissions Officers in Washington, DC, was the host organization for the data entry phase. This was a significant change for two reasons:

First, with paper records in hand, and the host organization representing America's registrars, problems of interpretation could be referred instantly to those local officials responsible for the preparation and maintenance of student records. Ambiguities concerning degree awards and transfer data, for example, were resolved quickly and authoritatively. *Second*, the paper records include information on such items as the location of the student's high school, high school graduation date and diploma type, and, sometimes, precollege test scores—such as those of the SAT and ACT—that can be compared with the extant electronic record. In the case of the Class of 1992 (NELS:88/2000), the electronic records concerning secondary school education were created in 1992. The postsecondary transcripts collected in 2000 enabled the data entry process to fill in cases of missing information such as high school locations, graduation dates, SAT and ACT scores, and cases in which SAT Verbal and Math scores had been inverted or ACT sub-test scores had been entered in the wrong order in the previous NELS:88/2000 electronic files.

In sum, the presence of the paper copies of transcripts in a combined data entry/editorial process for the Class of 1992 allowed for a more accurate and detailed account of postsecondary (and secondary school) histories than those of its two predecessors. A technical account of decision rules and other key features of the preparation of the transcript files is presented in appendix B.

Representativeness, Geographical Distribution, and Demography of the NELS Postsecondary Cohort

There are three sources of large-scale national cohorts for the study of postsecondary education experience. Two of these present event cohorts, with the event defined as entering postsecondary education for the first time: (1) the Cooperative Institutional Research Project's (CIRP) annual (since 1966) survey of entering freshmen, and the occasional longitudinal study that is spun from that survey (see, e.g., Astin, Tsui, and Avalos 1996); and (2) the Beginning Postsecondary Students (BPS) studies, a subset of the congressionally mandated National Postsecondary Student Aid Study (NPSAS), which has seen two longitudinal iterations: a 5-year study (1989-1994) and a 6-year study (1995-2001). The universe for the CIRP surveys is determined by the voluntary participation of institutions, subsequently weighted to yield national norms (see, e.g., Sax, Astin, Korn, and Mahoney 1995). The universe for the BPS longitudinal studies is determined by the representative national sampling framework of postsecondary students, undergraduate and graduate, enrolled in institutions participating in Title IV federal financial aid programs (Berkner, Horn, and Clune 2000).

While not invoked in this document, the CIRP and BPS are cited so that the reader sees the difference between "event cohort" histories and the "grade cohort" histories used here. While CIRP and BPS have many virtues, neither one can provide data on access to postsecondary education or linkages between postsecondary performance and detailed, documented precollege student background, and neither one is grounded in transcript data.

The third source for the analysis of postsecondary experience lies in the grade-cohort longitudinal studies such as the NELS:88/2000. These studies are not designed to yield representative samples of first-time college freshmen or undergraduates in general. The

NELS:88/2000 sample used in *Principal Indicators* consists of a cohort originally formed in the 8th grade in 1988 and refreshed in 1992 so as to be representative of 12th graders in 1992. The weights used in *Principal Indicators* combine that sampling frame with postsecondary status[1] But just how representative is the cohort when set against national data on first-time freshmen? Table 1.1 sets forth some basic data from which to judge this issue.

Table 1.1. 12th graders in 1992 who entered postsecondary education in 1992-93 as a proportion of all students who entered in 1992-93

Of the universe of 12th graders in 1992, those who first enrolled in postsecondary education in 1992-93	1.715 Million
All first-time undergraduates in 1992-93	2.184 Million
NELS students (1992 12th graders) as a proportion of the 1992-93 first-time undergraduate universe	**78.5%**

SOURCE: For first-time undergraduates, see Snyder. T., *Digest of Education Statistics, 2001*, table 182 (p. 217). For the NELS:88/2000, the universe consists of 12th graders in 1992 for whom transcripts were received.

Given these data, one can say only that, while accounting for nearly four out of five entering postsecondary students in their modal year of high school graduation and college entry, the 12th graders of the NELS:88/2000 are not a proxy group for entering postsecondary students. Nor were the 12th graders of the NLS-72 and High School & Beyond/Sophomores in their time. So what populations are represented in the presentation of the evidence in *Principal Indicators*?

The answer to the question was determined by the oldest of these cohorts, the NLS-72, where a nationally representative sample of students was selected in the 12th grade. Most of them graduated from high school on time in the spring of 1972, but some did not. For the High School & Beyond/Sophomore cohort, which was first sampled in the 10th grade, the 12th grade (1982) panel, limited to those who were in school in 1982 and those who received high school diplomas in 1982,[2] was selected to match the NLS-72. Again, most of these students graduated on time in 1982, but some did not. For the NELS:88/2000, the same procedure was followed, with the universe set to everyone who was in the 12th grade in1992 along with those who received

[1]Unlike its predecessors, the NELS:88/2000 longitudinal study sample was "refreshed" in 1990 (10th grade) and 1992 (12th grade) so as to be representative of the in-school population in those years. These refreshings resulted in complex panel weights. In addition to matching the Class of 1972 and 1982 frames, panel weights based on the 1992 sampling frame were chosen for *Principal Indicators* because 1992 was also the year in which high school transcripts were gathered, and a number of the tables link data based on high school transcripts to postsecondary access, attendance patterns, and attainment.

[2]Some of the students classified as "early graduates," transfers, and dropouts actually received on-time (1982) diplomas.

regular high school diplomas in the spring of 1992.[3] So, in all three cases, the population represented consists of nationally representative samples of those who were scheduled to be 12th graders in the year they were surveyed (see appendix C for a technical account of the weights and flags used to ensure that the data reflect these populations).

The first illustration of the precollegiate sampling frame in relation to matriculation behavior lies in the changing demographics and geography of postsecondary education. Table 1.2 presents the distribution of postsecondary participants in two of the longitudinal studies, the Class of 1982 (1982-1993) and the Class of 1992 (1992-2000), according to the Census Division[4] location of the students' high schools, by race/ethnicity and second language background.[5] In looking across the changes in the composition of these cohorts by Census Division, the reader will note

- when one combines the 5 Census Divisions of the West and South, an increasing share of students (from 48 percent to 55 percent),[6] parallel to general population trends (U.S. Bureau of the Census 1984; U.S. Bureau of the Census 1993);

- statistically significant increases in the proportion of students from second language backgrounds in New England, the Mid-Atlantic states, the West South Central states, and the Pacific states;

- statistically significant increases in overall minority participation from high schools in New England and the Pacific states;

- the higher proportion of African-Americans among postsecondary participants who graduated from high schools in the South Atlantic and East South Central states compared to the proportion of African-Americans among postsecondary

[3]Some of the students classified as not in the 12th grade received regular diplomas in the spring of 1992. General Education Diplomas (GEDs) awarded in 1992 were excluded.

[4] The NCES grade cohort longitudinal studies are not designed for state-level analysis. The smallest unit of geographical order in the longitudinal studies data sets is the Census Division, and the nine Census Divisions are composed as follows: New England: CT, MA, ME, NH, RI, VT; Mid-Atlantic: DE, NJ, NY, PA; East North Central: IL, IN, MI, MN, OH, WI; West North Central: IA, KS, MO, NE, ND, SD; South Atlantic: DC, FL, GA, MD, NC, SC, VA, WVA; East South Central: AL, KY, MS, TN; West South Central: AR, LA, OK, TX; Mountain: AZ, CO, ID, MT, NV, NM, UT, WY; and Pacific: AK, CA, HI, OR, WA.

[5]For both the HS&B/So and the NELS:88/2000, second language dominance was determined by (1) student responses concerning their native language, the dominant language of their households, and the extent to which they conversed with their mothers in a language other than English; and (2) the presence of English as a Second Language (ESL) coursework on high school and/or college transcripts and/or coursework labeled "X[a language other than English] for Native Speakers."

[6]The data are not directly in the table. For the HS&B/So, the 5 Census Divisions commanded 47.6 percent of enrollments (s.e. = 1.01); for the NELS:88/2000, the same 5 Census Divisions commanded 54.5 percent of enrollments (s.e. = 1.12).

participants who graduated from high schools, for example, in the Mid-Atlantic states or the Pacific states;

- the higher proportion of Latino students among postsecondary participants who graduated from high schools in the West South Central, Mountain, and Pacific states compared to the proportion of Latino students among postsecondary participants who graduated from high school, for example, in the Mid-Atlantic states or the South Atlantic states; and

- the notable increases in the proportion of Asian-American postsecondary participants who graduated from high schools in New England, the Mid-Atlantic, East North Central, and Pacific states.

The high school class of 1972 is not included in the comparisons of table 1.2 and table 1.3 because the definition of second language background in the NLS-72 was based wholly on the dominant language spoken by the student's parents. The definition for the high school classes of 1982 and 1992 was a more complex construction that focused on the student's first language, dominant language, and language with which parents were addressed in the home[7].

[7]While not included in this definition (or in the tables), it is worth noting that, of all students who earned more than 10 postsecondary credits, 11 percent of Asian students (s.e.=2.54) and 15 percent of Latino students (s.e.=2.07) earned credits for "heritage" language study in higher education. Among those who earned bachelor's degrees, 18 percent of Asian students (s.e.=4.02) and 23 percent of Latino students (s.e.=3.18) earned postsecondary credits for "heritage" language study. The difference between Asian and Latino students at the bachelor's level is not statistically significant.

Table 1.2. Percentage distribution of race/ethnicity and second language background, by Census Division of high school: 1992 12th graders who were likely postsecondary participants (1992-2000) compared with 1982 12th graders who were likely postsecondary participants (1982-1993)

	Percentage distribution of students by race/ethnicity					Percent of students from second language backgrounds	Percent of cohort in Census Division
	White	African-American	Latino	Asian	American Indian		
New England							
Class of 1992	76.4 (5.33)	8.6 (3.46)	8.2 (3.32)	4.6 (1.36)	2.2 (1.71)	9.2 (1.95)	**4.8 (0.65)**
Class of 1982	*93.5 (1.57)*	*3.6 (1.16)*	*2.3 (0.81)*	*0.5 (0.23)*	*0.1 (0.09)*	*4.1 (1.24)*	***7.1 (0.76)***
Mid-Atlantic							
Class of 1992	80.1 (2.63)	9.4 (2.04)	5.8 (1.06)	4.4 (0.67)	0.4 (0.13)	10.3 (1.37)	**15.2 (1.04)**
Class of 1982	*80.8 (2.20)*	*11.5 (1.85)*	*5.0 (0.73)*	*1.4 (0.25)*	*0.7 (0.26)*	*6.9 (0.92)*	***16.1 (0.81)***
East North Central							
Class of 1992	87.1 (1.95)	4.8 (0.90)	3.6 (0.85)	4.3 (1.23)	0.2 (0.07)	5.0 (1.09)	**17.0 (0.87)**
Class of 1982	*87.2 (1.45)*	*8.1 (1.30)*	*3.1 (0.60)*	*1.2 (0.24)*	*0.4 (0.13)*	*3.6 (0.62)*	***20.7 (0.82)***
West North Central							
Class of 1992	94.1 (1.23)	2.5 (0.82)	2.2 (0.87)	1.1 (0.25)	0.1 (0.07)	1.8 (0.52)	**8.2 (0.58**
Class of 1982	*94.7 (1.04)*	*2.1 (0.82)*	*1.6 (0.50)*	*0.2 (0.12)*	*0.5 (0.22)*	*1.6 (053)*	***8.7 (0.53)***
South Atlantic							
Class of 1992	62.8 (3.42)	27.1 (3.43)	4.4 (1.14)	3.9 (1.07)	1.9 (1.11)	6.6 (1.48)	**16.9 (0.95)**
Class of 1982	*72.7 (2.50)*	*21.4 (2.37)*	*3.6 (0.65)*	*1.7 (0.37)*	*0.3 (0.13)*	*4.4 (0.70)*	***14.6 (0.79)***

See notes at end of table.

Table 1.2. Percentage distribution of race/ethnicity and second language background, by Census Division of high school:1992 12th graders who were likely postsecondary participants, 1992-2000, compared with 1982 12th graders who were likely postsecondary participants, 1982-1993–Continued

	Percentage distribution of students by race/ethnicity					Percent of students from second language backgrounds	Percent of cohort in Census Division
	White	African-American	Latino	Asian	American Indian		
East South Central							
Class of 1992	79.0	18.2	1.0	1.2	0.5	0.7	**6.1**
	(4.74)	(4.84)	(0.37)	(0.37)	(0.46)	(0.27)	**(0.54)**
Class of 1982	*80.2*	*17.9*	*0.9*	*0.4*	*0.6*	*1.1*	***5.3***
	(3.66)	*(3.60)*	*(0.59)*	*(0.23)*	*(0.25)*	*(0.51)*	***(0.29)***
West South Central							
Class of 1992	68.5	11.4	18.2	1.6	0.3	12.6	**11.2**
	(3.88)	(2.77)	(3.18)	(0.34)	(0.13)	(2.41)	**(0.70)**
Class of 1982	*71.7*	*15.3*	*11.1*	*0.4*	*1.4*	*6.1*	***9.3***
	(2.89)	*(2.66)*	*(1.36)*	*(0.17)*	*(0.60)*	*(0.99)*	***(0.65)***
Mountain							
Class of 1992	71.6	0.3	21.8	3.5	2.8	16.4	**6.5**
	(7.05)	(0.19)	(7.24)	(0.98)	(1.47)	(6.48)	**(0.66)**
Class of 1982	*78.0*	*0.5*	*13.8*	*1.5*	*6.1*	*9.8*	***5.0***
	(4.65)	*(0.38)*	*(2.83)*	*(0.56)*	*(3.16)*	*(2.76)*	***(0.40)***
Pacific							
Class of 1992	56.0	5.1	22.4	15.3	1.2	25.3	**14.1**
	(3.89)	(1.27)	(3.08)	(2.11)	(0.73)	(3.55)	**(0.80)**
Class of 1982	*72.8*	*6.7*	*11.1*	*6.9*	*1.4*	*9.8*	***13.1***
	(2.40)	*(1.42)*	*(1.26)*	*(1.12)*	*(0.31)*	*(1.21)*	***(0.76)***

NOTES: (1) Universe consists of 12th graders who became likely postsecondary participants. Weighted Ns: Class of 1982 = 2.40M; Class of 1992 = 2.11M. (2) Row totals for race/ethnicity may not sum to 100.0 percent because of rounding. Column totals for percent of cohort may not sum due to rounding. (3) Standard errors are in parentheses.
SOURCES: High School & Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript File, NCES 2003-402.

Second Language Populations in the Postsecondary System

The reader of table 1.2 may be struck by the statistically significant increases in the participation of students from second language backgrounds in four of the nine Census Divisions (New England, Mid-Atlantic, West South Central, and Pacific). Some of those increases are rather substantial. This observation calls for a closer look at overall change in the demography of language over the histories of the two cohorts, as displayed in tables 1.3 and 1.4.

Table 1.3. Percent of 1982 and 1992 12th graders who became postsecondary students who were from second language backgrounds, by race/ethnicity and socioeconomic status

	Percent of students who were from second language backgrounds	
	Class of 1982	**Class of 1992**
All	**5.3 (0.33)**	**10.2 (0.90)**
Race/ethnicity		
White	1.8 (0.22)	2.3 (0.33)
African-American	1.7 (0.58)	4.3 (2.06)
Latino	44.3 (2.77)	56.0 (3.81)
Asian	57.7 (3.67)	52.0 (3.73)
American Indian	17.2 (5.49)	18.2 (8.07)
SES quintile		
81st-100th percentile (high)	2.4 (0.34)	6.2 (0.75)
61st-80th percentile	4.1 (0.54)	5.8 (1.11)
41st-60th percentile	3.8 (0.49)	6.2 (0.99)
21st-40th percentile	6.2 (0.77)	11.4 (1.48)
1st-20th percentile (low)	15.8 (1.58)	37.1 (3.99)

NOTES: The universes for each cohort consist of 12th graders who became postsecondary participants. Weighted Ns: Class of 1982 = 2.01M; Class of 1992 = 2.09M. (2) Standard errors are in parentheses.
SOURCES: High School & Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

In table 1.3, one notes the increase in the proportion of Latino postsecondary participants who met the criteria for second language dominance used for analyses of the Class of 1982 and the Class of 1992 (student identified a language other than English as the first language they learned, and the dominant language of their households, indicated that they conversed with their mothers frequently in a language other than English, or presented high school and/or college transcripts with ESL coursework or coursework labeled "X [a language other than English] for Native Speakers"). Also notable is that there was no statistically significant difference in the proportion of Asian and Latino students from second language backgrounds in the Class of 1992, and that roughly one out of six American Indian postsecondary students came from a second language

background in both the Class of 1982 and the Class of 1992. The other distinctive feature of table 1.3 is the comparative concentration of students from second language backgrounds within the lowest SES quintile.[8]

Table 1.4 is included simply to demonstrate that, among students from second language backgrounds, there is no difference in the percent for whom the "true" first postsecondary institution of attendance is a 4-year college versus a community college, whereas for native speakers of English, there has been a consistent and statistically significant spread between the percent starting in a 4-year college and the percent first entering a community college.

Reminder: The "true" first institution of attendance excludes (1) colleges and community colleges in which the student was enrolled prior to high school graduation; (2) institutions in which the student was enrolled during the summer immediately following high school graduation and before fall term postsecondary entry (unless the institution was the same in both periods); and (3) "false starts," that is, cases in which the student enrolled but then withdrew during the first term of attendance, only to enroll and complete coursework in a different institution at a later point in time (in these cases, the second institution is the true first institution). This definition of true first institution of attendance is used throughout this document.

Table 1.4. Percent of 1982 and 1992 12th graders who were from second language backgrounds and native speakers of English by type of first true postsecondary institution of attendance

Second language background	Class of 1982	Class of 1992
Any 4-year	48.1 (2.77)	47.8 (3.28)
Community college	43.8 (2.74)	46.4 (3.41)
Other sub-baccalaureate	8.1 (1.58)	5.8 (1.48)
Native speakers of English		
Any 4-year	53.4 (0.99)	55.7 (1.15)
Community college	39.1 (0.97)	39.6 (1.16)
Other sub-baccalaureate	7.5 (0.48)	4.7 (0.38)

NOTES: The universes for each cohort consist of 12th graders who became postsecondary participants. Weighted Ns: Class of 1982 = 2.01M; Class of 1992 = 2.09M. (2) Standard errors are in parentheses. (3) Column totals for first institution of attendance may not sum to 100.0 percent because of rounding.
SOURCES: High School & Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

[8]The NELS:88/2000 files allow for a complex analysis of the educational histories of Latino and Asian-American populations by generational status. For a treatment of these issues in relation to non-English dominant households, see Bradby 1992 and Kaufman, Chavez, and Lauen 1999.

Geographic Mobility of the High School Class of 1992

Unlike its predecessors, the history of the Class of 1992 allows the analyst to track the geographic mobility of the student population, principally with reference to the state locations of schools attended, and at four points in time: (1) high school; (2) true first postsecondary institution attended; (3) postsecondary institution awarding the student's highest undergraduate degree; and (4) the student's final interview in 2000. This feature of the data set is helpful in determining the permeability of state borders, and provides a background national tapestry against which those responsible for state postsecondary planning can assess the likelihood of students moving across state lines after initial entry in higher education, as well as estimating the likelihood that students will remain within state after earning credentials.

Table 1.5. State residential patterns at three points in educational histories of the high school Class of 1992, by race/ethnicity, selectivity of true first institution attended, and highest degree earned by December 2000

	State of residence was the same for:				
	High school, 1st institution attended, and 2000 interview	High school and 1st institution attended	1st institution attended and 2000 interview	High school and 2000 interview	[No state was the same]
All	66.0 (1.02)	13.9 (0.69)	4.3 (0.41)	9.6 (0.61)	6.2 (0.45)
By race/ethnicity					
White	63.5 (1.12)	15.5 (0.81)	4.3 (0.42)	9.7 (0.64)	6.9 (0.53)
African-American	67.8 (3.87)	7.0 (1.02)	6.2 (2.37)	14.7 (3.05)	4.3 (1.57)
Latino	81.1 (2.68)	8.4 (2.09)	2.2 (1.17)	4.7 (0.98)	3.6 (1.01)
Asian	68.9 (3.53)	17.6 (3.27)	3.3 (0.74)	6.1 (1.23)	4.1 (0.87)
By selectivity of 1st institution					
Highly selective	22.8 (4.58)	10.3 (3.48)	12.6 (4.82)	20.0 (4.45)	34.4 (5.30)
Selective	47.6 (2.83)	18.7 (1.89)	4.2 (0.77)	15.3 (1.78)	14.3 (1.75)
Nonselective	61.7 (1.33)	15.7 (0.91)	4.2 (0.44)	11.9 (0.93)	6.5 (0.62)
Open door	79.0 (1.48)	11.5 (1.21)	3.4 (0.72)	4.8 (0.74)	1.4 (0.22)
Not ratable	65.7 (5.70)	8.9 (3.29)	10.4 (4.16)	11.5 (5.32)	3.5 (1.32)
By highest degree					
None	74.3 (1.46)	11.6 (1.17)	3.7 (0.68)	7.9 (0.85)	2.4 (0.29)
Certificate	77.7 (4.23)	10.6 (4.01)	1.5 (0.55)	8.2 (2.15)	1.9 (0.85)
Associate's	79.0 (2.71)	8.2 (1.70)	3.0 (0.72)	6.5 (1.87)	3.3 (1.37)
Bachelor's	55.8 (1.53)	16.7 (0.94)	5.7 (0.72)	11.5 (1.02)	10.3 (0.90)
Graduate	48.5 (3.26)	22.5 (2.68)	3.1 (0.75)	13.4 (1.73)	12.4 (2.37)

NOTES: (1) Universe consists of all 1992 (12th grade) NELS panelists who became postsecondary participants for whom the state pattern could be determined. Weighted N = 2.135M. (2) Rows may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses. **SOURCE:** NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 1.5 presents the distribution of student mobility using three reference points: the state of the student's high school, the state of the student's true first institution of attendance, and the state in which the student was living at the time of his or her computer-assisted telephone interview in 2000. The reader will note that

- roughly two out of three students resided in the same state at all three reference points;
- the more selective the true first institution of attendance, the more likely students were to cross state lines at some moment in their education and residence history to age 26 or 27;
- Latinos were the least likely of the major race/ethnicity groups to cross state lines in their education and residence history to age 26 or 27;
- those who earn bachelor's degrees or higher were more likely to cross state lines at some moment in their education and residence history to age 26 or 27; and
- roughly 1 out of 10 students initially went out-of-state for postsecondary education but returned to the state of his or her high school by age 26 or 27.

Tables 1.6 and 1.7 focus on the inter-state and inter-institutional mobility of bachelor's degree recipients of the Class of 1992. These have become increasingly important dimensions of student behavior that shed light on institutional accountability policies. Students may leave institution A and cross state lines to enroll in institution B for reasons ranging from the search for the right academic program to health considerations; however, institution A is held accountable for the fact that the student left, and, it is assumed, is a college dropout. Institutions and states currently do not have the capacity to track students across state lines and discover, for example, that the students completed degrees at institution B. But the transcript files of the national grade-cohort longitudinal studies can do just that, and thus encourage the development of tracking systems for accountability purposes. Table 1.6 asks where the student began postsecondary education and where the bachelor's degree was awarded and how many institutions were involved between those two markers. The most basic conclusions of table 1.6 are:

- Of all bachelor's degree recipients (including those who began their postsecondary careers in community colleges) or only those who first entered a bachelor's degree-granting institution, roughly 1 out of 10 earned their degree from an institution located in a state *other than* the state in which they started out in postsecondary education.
- For those who began in 4-year colleges and earned bachelor's degrees, one out of five earned the degree from an institution *other than* their first institution.

As a guide to reading table 1.6, two examples might help: (1) of all bachelor's degree recipients who attended two institutions (37 percent of all bachelor's degree recipients), nearly half (46 percent) earned their degree from an institution other than the one in which they started out, and 12 percent crossed state lines in the process; and (2) of all bachelor's degree recipients who started in 4-year colleges and attended three of more schools (19 percent), 28 percent earned the degree in a state other than the state in which they began their postsecondary studies.

How much of a change does the history of the Class of 1992 against its predecessors in these matters suggest? While the geography is difficult to extract from the earlier data sets, the data on numbers of institutions and differences between first and last institution of attendance are easier to elicit. So, for example, of bachelor's degree recipients in the Class of 1972 who attended two institutions (38.2 percent of all bachelor's degree recipients in that cohort), 33.1 percent (s.e.=1.51) earned their degree from an institution other than the one in which they started out (data not in table). When compared with the 46.4 percent rate (s.e.=2.04) of the Class of 1992 two decades later, it appears that there has been a measurable increase in this type of mobility. When questions are asked about institutional graduation rates, these data might be kept in mind.

Table 1.6. Percent of the Class of 1992 who earned bachelor's degrees by December 2000 in an institution other than their 1st institution of attendance and in a state other than the state in which they first attended: by number of postsecondary schools attended

	Percent of students for whom the bachelor's degree was:		Percent of students for whom the bachelor's degree was awarded in a different state than 1st state	**Percent of total**
	Awarded by 1st institution of attendance	Awarded by a different institution		
All bachelor's				
TOTAL	**66.8 (1.23)**	**33.2 (1.23)**	**9.9 (0.74)**	**100.0**
Number of schools attended:				
One	100.0 (1.00)			**40.6 (1.31)**
Two	53.6 (2.04)	46.4 (2.04)	11.5 (1.18)	**36.6 (1.20)**
More than two	28.8 (2.18)	71.2 (2.18)	25.2 (2.40)	**22.8 (1.14)**
Bachelor's whose 1st institution was a 4-year college				
TOTAL	**80.2 (1.05)**	**19.8 (1.05)**	**9.0 (0.78)**	**100.0**
Number of schools attended:				
One	100.0 (1.00)			**48.7 (1.40)**
Two	73.1 (1.90)	26.9 (1.90)	11.4 (1.30)	**32.3 (1.19)**
More than two	41.3 (2.81)	58.7 (2.81)	28.4 (2.89)	**19.0 (1.07)**

Not applicable.

NOTES: (1) 12th graders in 1992 who earned bachelor's degrees and for whom the true first institution of attendance could be determined (Weighted N = 923); 1992 12th graders who earned bachelor's degrees and whose first institution of attendance was a 4-year college (Weighted N = 768k). (2) The "Percent of Total" columns for each universe may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 1.7 responds to a question asked by those interested in state investments in postsecondary education in relation to state economic development: What proportion of those who earn their bachelor's degree in a state stay on in that state after graduation? In the Class of 1992, 62 percent of bachelor's degree recipients remained in state, but there are a few significant departures from this marker that are worth noting**:**

- Majors in Education are more likely than majors in other fields to stay in the state in which they earned their bachelor's degree, most likely because their major program resulted in certification in that state.

- Students receiving their bachelor's degrees from comprehensive colleges (Carnegie Classes 21 and 22) are more likely to remain in the state in which they earned their bachelor's degree than students receiving their degrees from other classes of 4-year institutions.

- The more selective the institution from which the bachelor's degree was earned the less likely the student was to stay in the state in which that institution was located.

- Students who attended school in more than one state as undergraduates are more likely to move to another state after receiving the bachelor's degree.

For those who ask what proportion of students leave their home states for college but return after their postsecondary experience (whether or not they earned degrees), table 1.5 shows that 10 percent of the Class of 1992 did just that (the state of residence was the same for high school and the NELS:88/2000 interview in 2000, but not the same for the first institution attended).

Table 1.7. Percent of students in the Class of 1992 who earned a bachelor's degree by December 1999 and who resided in the same state in which they received their bachelor's degree in the Spring of 2000, by undergraduate major, type of institution awarding degree, selectivity of institution awarding degree, and number of states in which student attended school as an undergraduate

	Residence in Spring 2000		
	Same state as the state in which bachelor's awarded	Different state from the state in which bachelor's awarded	s.e.
All bachelor's degrees by December 1999	61.9	38.1	(1.28)
Bachelor's degree major			
Business	63.5	36.5	(2.84)
Education	78.2	21.8	(2.89)
Engineering/EnginTech/Architecture	46.2	53.8	(4.84)
Physical sciences	50.7	49.3	(10.6)
Mathematics/Computer science	55.4	44.6	(7.96)
Life science	68.0	32.0	(3.10)
Health sciences and services	64.4	35.6	(3.58)
Humanities	53.7	46.3	(5.45)
Fine and performing arts	62.4	37.6	(4.98)
Social sciences	60.2	39.8	(2.75)
Applied social sciences	66.0	34.0	(3.46)
Other	49.4	50.6	(8.73)
Type of institution awarding degree			
Doctoral	57.8	42.2	(1.82)
Comprehensive	72.9	27.1	(1.79)
Baccalaureate	54.5	45.5	(3.10)
Specialized	45.3	54.7	(11.0)
Selectivity of institution awarding degree			
Highly selective	36.8	63.2	(5.36)
Selective	52.3	47.7	(2.63)
Nonselective	68.6	31.4	(1.36)
Not rated	55.3	44.7	(9.67)
Number of states attended as undergrad			
One	69.1	30.9	(1.38)
Two or more	37.8	62.2	(2.62)

NOTES: (1) Universe consists of all 1992 (12th grade) NELS panel members who earned bachelor's degrees by December 1999 and for whom state of residence in 2000 could be determined. Weighted N = 881k. (2) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Part 2:
Participation, Degrees, Credits, and Time:
The Postsecondary Attainments of Three Cohorts

In this section, the reader will find transcript-based national time-series data on educational attainment after high school for traditional-age students, reflecting the current status of NCES databases, and covering three longitudinal studies cohorts from 1972 to 2000. We start with degree completion and time-to-degree because these have become increasingly important accountability policy issues nationally and in state legislatures, then turn to access and different degrees of participation.

In recent years, the two most often asked questions about U.S. higher education have become:

- What percentage of people who go to college earn a bachelor's degree? and
- How long does it take them to earn it?

The virtue of national transcript-based longitudinal studies is that they can answer these questions with powerful empirical evidence. Students change schools (McCormick 1997; Adelman 1999b; Horn and Kojaku 2001) and students often cross state lines when they change schools (as documented in table 1.5). Students move in and out of higher education over a long period of time (Horn 1998). What we now call "noncontinuous enrollment" appears to be commonplace (Hearn 1992). By following the student in space and time, the national transcript studies enable us to provide systemwide completion rates in response to the two questions—that is, the transcript studies allow us to describe what happened to students anywhere, and not just at the first postsecondary institution they attended.

The three cohort samples are different in some important respects, which may account for some of the changes indicated in the tables in this section. The most basic difference is that the sampling of the high school class of 1972 took place in the spring semester of its senior year, whereas those for the high school classes of 1982 and 1992 took place at earlier points (10th grade and 8th grade, respectively). Even though the analyses in *Principal Indicators* are limited to 12th graders in the Class of 1982 and the Class of 1992, some of those students did not finish high school (though they may have earned equivalency diplomas) yet years later took courses at trade schools or community colleges. While this document does not analyze these relationships, one can hypothesize that the majority of those who do not complete high school do not possess the same academic resources or attitudes toward persistence as those who do.

Taken as whole groups, one would expect students of the high school Classes of 1972 and 1982 who entered postsecondary education to be more successful in terms of degree completion and academic performance than their counterparts from the Class of 1992 because the concluding date of the longitudinal study gave them more time to complete. However, as tables 2.1 and 2.2 demonstrate, these expectations are not necessarily accurate.

For purposes of this document, the universes of comparison are confined to those who earned more than 10 semester credits in postsecondary education over the period of their respective histories. This strategy enables one to exclude incidental students (those who earned 10 or fewer credits) from the analysis, and has been followed elsewhere in the literature (e.g., McCormick 1999) and in state systems analyses (e.g., Steppanen 2000). In all three transcript samples, there are hundreds of students (representing tens of thousands) whose records consist either of nothing but withdrawals, incompletes, and failures or who take two or three courses and then disappear from education—at least through the censoring dates of the study (see table 3.2 for a portrait of incidental students in the Class of 1992).

Given the threshold criterion of earning more than 10 credits, here is what we see in response to the two basic questions most often asked about higher education:

	Class of 1972 (12 years)	Class of 1982 (11 years)	Class of 1992 (8.5 years)
Of those who earned more than 10 credits, the proportion with bachelor's degrees (table 2.1)	48.0%	45.3%	48.7%
Of those who earned more than 10 credits and *any* credits from a 4-year college at any time, the proportion with bachelor's degrees (table 2.2)	66.1	65.6	66.5
Of those who earned bachelor's degrees within 8.5 years of the modal high school graduation date for the cohort, the mean time-to-degree in elapsed calendar years (table 2.3)	4.34 SD=1.02 s.e.= 0.019	4.45 SD=1.00 s.e=0.026	4.56 SD=1.09 s.e=0.028

NOTE: SD = standard deviation; s.e. = standard error.

The 8.5-year bachelor's degree attainment rate for the Class of 1992 is not significantly different from that for the 12-year rate for the Class of 1972, no matter which universe is used, leading to the hypothesis that the system is doing better in degree completion than was the case a quarter century ago. These data also offer a general conclusion about national graduation rates: roughly 2 out of 3 traditional-age students who earned more than10 credits *and* attended a bachelor's degree-granting institution also earned a bachelor's degree by their mid-to-late twenties. Capping the history of all three cohorts at the Class of 1992 time span of 8.5 years from the modal high school graduation date, time-to-degree for traditional-age students has risen slightly

over the period covered by the cohort histories. In terms of more common metrics for understanding time-to-degree, a calendar year is the equivalent of a 9-month academic year (September through May) plus 3 months or 0.25 of a year, hence 4.5 calendar years (the average time-to-degree for the high school classes of 1982 and 1992) is the equivalent of 4.75 academic years.

Among the highlights of tables 2.1 through 2.3 that invite further investigation in light of the data to be presented in Parts 3 and 4 of this document are the following:

- The rate and direction of change in attainment of at least a bachelor's degree for African-Americans. The rate declined notably between the Class of 1972 and the Class of 1982, then rebounded considerably in the Class of 1992 (tables 2.1 and 2.2).

- Among students who earned any credits from 4-year colleges, the relative decline in the rate of men's attainment of at least a bachelor's degree versus that for women between the Class of 1982 and the Class of 1992 (table 2.2).

- The increase in the proportion of students engaging in post-baccalaureate work in the Class of 1992 cohort, particularly as they had less time to enter graduate school than did students in the other two cohorts.[9] Other data sources, particularly the National Postsecondary Student Aid Study (NPSAS) surveys, strongly suggest that the increase in post-baccalaureate enrollments is weighted toward a population over the age of 30 (Korb, Schantz, and Zimbler 1989; Choy and Moskovitz 1998).

- The rise in mean credits earned by bachelor's degree recipients as parallel to the increase in time-to-degree (see California Postsecondary Education Planning Commission 1988). The match is not exact. For example, between the Class of 1972 and the Class of 1992 cohorts there was a 6.4 percent increase in mean credits earned and a 5 percent increase in time-to-degree (with an effect size of 1.12, indicating a modestly positive relationship). However, this is an imperfect measure, and analysts are encouraged to engage in multivariate analyses of the factors associated with time-to-degree (table 2.3).

The last observation draws attention to the reason that table 2.3 includes Standard Deviations rather than standard errors (see appendix D for the standard errors for table 2.3). The Standard Deviation allows one to estimate whether students are behaving more alike (the Standard Deviation will contract over time) or less alike (the Standard Deviation will expand over time), though the judgment requires a test of effect size. So, for example, as the average number of credits earned by engineering graduates increased from 137.1 for the Class of 1972 to 150.6 for the Class of 1992, the Standard Deviation declined from 23.2 to18.4. The *t*-test using the standard errors tells us that this change in the average number of credits earned is significant. At the same time, the test for the change in Standard Deviation tells us that engineering graduates in the Class of 1992 are more alike in terms of the number of credits they earned than those students who graduated 20 years earlier (the effect size is 1.21, a positive relationship). This observation can lead to hypotheses about the effect of changes in accreditation requirements for engineering programs promulgated by the Accreditation Board for Engineering and Technology (ABET) in 1991 (ABET 1992).

---

[9]Not in table 2.1. Percent of Class of 1972 doing post-baccalaureate study: 12.5 (s.e. = 0.58); Class of 1982: 13.4 (s.e. = 0.57); Class of 1992: 15.1 (s.e. = 0.64).

Table 2.1. Highest degree attained by 12th graders in the high school classes of 1972 (through 1984), 1982 (through 1993), and 1992 (through 2000) who earned more than 10 postsecondary credits, by gender and race/ethnicity

	Percent of students whose highest degree was . . .								
	None	Certif	Associate	Bachelor's	Bachelor's plus some Grad	Master's	First Prof/ Doct	At least bachelor's	**Percent of total in cohort**
All									
Class of 1972	37.4	4.5	10.1	35.5	4.0	6.2	2.3	48.0	†
Class of 1982	35.9	8.6	10.3	31.9	6.7	4.7	2.0	45.3	†
Class of 1992	35.7	6.2	9.3	33.6	8.9	4.7	1.5	48.7	†
Men									
Class of 1972	37.9	3.1	8.9	36.5	3.9	6.1	3.5	50.0	51.2
Class of 1982	37.3	7.3	8.7	33.0	6.3	4.6	2.9	46.8	46.3
Class of 1992	41.0	5.1	8.8	32.1	8.0	3.7	1.4	45.2	46.3
Women									
Class of 1972	36.8	6.0	11.4	34.6	4.0	6.3	0.9	45.8	48.8
Class of 1982	34.6	9.6	11.7	31.0	7.0	4.8	1.2	44.0	53.7
Class of 1992	31.1	7.2	9.9	35.0	9.7	5.7	1.5	51.8	53.7
White									
Class of 1972	34.9	4.5	10.3	37.4	4.1	6.5	2.3	50.3	87.2
Class of 1982	32.1	8.6	10.5	34.3	7.3	5.2	1.9	48.7	81.8
Class of 1992	32.0	6.0	9.5	36.0	9.5	5.5	1.4	52.4	75.7
African-American									
Class of 1972	53.8	4.8	7.7	25.8	1.4	4.8	1.8	33.8	8.1
Class of 1982	58.8	8.9	7.7	18.3	3.0	2.4	0.9	24.6	10.0
Class of 1992	48.1	7.1	7.9	29.2	5.2	2.1	0.4	36.9	9.6
Latino									
Class of 1972	60.3	3.6	11.2	16.5	5.6	1.5	1.3	24.9	3.5
Class of 1982	50.9	8.2	13.4	20.1	4.3	1.8	1.4	27.6	4.9
Class of 1992	55.3	7.6	9.8	17.3	7.2	2.3	0.5	27.3	9.0
Asian									
Class of 1972	30.3	1.3	6.2	42.1	5.6	8.1	6.5	62.3	1.2
Class of 1982	30.4	3.9	8.0	33.2	7.4	6.6	10.5	57.7	1.9
Class of 1992	29.0	5.0	8.8	37.5	10.6	3.4	5.6	57.1	5.0

† Not applicable.
NOTES: (1) Rows may not sum to 100.0 percent because of rounding. (2) For standard errors of the estimates, see Appendix D. (3) Weighted Ns: Class of 1972 = 1.54M; Class of 1982 = 2.08M; Class of 1992 = 1.90M.
SOURCES: National Center for Education Statistics**:** National Longitudinal Study of the High School Class of 1972, High School & Beyond/Sophomore Cohort, NCES 2000-194, and NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402**.**

Table 2.2. Highest degree attained by 12th graders in the high school classes of 1972 (through 1984), 1982 (through 1993), and 1992 (through 2000) who earned more than 10 postsecondary credits and any credits from a 4-year college, by gender and race/ethnicity

	Percent of students whose highest degree was . . .								
	None	Certif	Associate	Bach-elor's	Bachelor's plus some Grad	Master's	First Prof/ Doct	At least Bachelor's	**Percent of total in cohort**
All									
Class of 1972	27.8	1.2	4.8	48.9	5.5	8.6	3.1	66.1	†
Class of 1982	26.7	2.0	5.6	46.3	9.7	6.8	2.8	65.6	†
Class of 1992	25.5	1.9	6.1	45.9	12.2	6.5	1.9	66.5	†
Men									
Class of 1972	28.4	0.8	4.3	48.4	5.2	8.2	4.8	66.6	52.8
Class of 1982	26.4	1.7	5.4	47.0	8.9	6.5	4.1	66.5	47.4
Class of 1992	31.2	1.4	5.9	43.7	10.9	5.0	1.9	61.5	46.8
Women									
Class of 1972	27.4	1.8	5.6	49.1	5.8	9.1	1.3	65.3	47.2
Class of 1982	27.0	2.3	5.8	45.7	10.4	7.1	1.7	64.9	52.6
Class of 1992	20.4	2.4	6.2	47.9	13.3	7.8	2.0	71.0	53.2
White									
Class of 1972	25.7	1.3	4.9	50.5	5.7	8.8	3.2	68.2	87.1
Class of 1982	23.4	2.1	5.5	48.5	10.5	7.3	2.7	69.0	83.6
Class of 1992	23.4	1.9	5.5	47.6	12.6	7.3	1.8	69.3	78.4
African-American									
Class of 1972	45.8	1.3	4.6	36.8	2.1	6.9	2.6	48.4	7.9
Class of 1982	56.0	0.6	3.3	29.8	4.8	4.0	1.5	40.1	9.1
Class of 1992	35.6	3.7	5.5	43.8	7.7	3.1	0.6	55.3	8.7
Latino									
Class of 1972	47.8	*	7.3	29.1	9.8	2.7	2.3	43.9	2.3
Class of 1982	35.4	3.2	11.4	36.6	7.7	3.2	2.5	50.0	4.1
Class of 1992	39.2	1.8	10.1	30.9	12.9	4.1	1.0	48.9	6.8
Asian									
Class of 1972	15.6	*	4.0	54.5	7.3	10.5	7.8	80.1	1.3
Class of 1982	17.2	0.8	6.2	43.7	9.7	8.6	13.7	76.7	2.2
Class of 1992	21.8	0.2	9.3	45.2	12.8	4.1	6.7	68.8	5.5

* Rounds to zero.
† Not applicable.
NOTES: (1) Rows may not sum to 100.0 percent because of rounding; (2) for standard errors of these estimates, see Appendix D. (3) Weighted Ns: Class of 1972 = 1.11M; Class of 1982 = 1.22M; Class of 1992 = 1.39M.
SOURCES: National Center for Education Statistics: National Longitudinal Study of the High School Class of 1972, High School & Beyond/Sophomore Cohort, NCES 2000-194, and NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 2.3. Time to bachelor's degree and average undergraduate credits earned by those in the high school classes of 1972, 1982, and 1992 who were awarded bachelor's degrees within 8.5 years of the modal high school graduation date for their class

	Average time-to-degree						Average total undergraduate credits					
	Class of 1972	SD	Class of 1982	SD	Class of 1992	SD	Class of 1972	SD	Class of 1982	SD	Class of 1992	SD
All	4.34	1.02	4.45	1.00	4.56	1.09	130.1	20.2	134.3	15.7	138.4	18.0
Men	4.45	1.05	4.56	1.01	4.68	1.11	131.3	20.9	135.0	16.0	138.3	16.8
Women	4.22	0.97	4.36	0.98	4.47	1.06	128.8	19.4	133.7	15.4	138.4	18.9
White	4.32	1.01	4.44	1.00	4.51	1.06	129.9	20.1	134.2	15.8	137.8	18.0
African-American	4.39	1.10	4.57	0.95	4.67	1.14	132.7	21.1	134.1	13.9	140.9	16.7
Latino	5.07	1.28	4.66	1.02	5.11	1.24	133.9	26.3	136.2	18.1	140.3	18.8
Asian	4.50	0.98	4.61	1.01	4.61	1.08	130.6	20.3	135.8	14.3	141.5	19.1
Selected Major												
Business	4.41	1.05	4.46	1.01	4.53	1.08	128.4	17.3	131.6	13.3	134.6	15.0
Education	4.19	0.92	4.56	0.97	4.69	1.17	131.1	18.7	136.7	15.9	144.2	16.9
Engineering	4.51	1.12	4.74	1.02	4.68	1.01	137.1	23.3	147.1	19.4	150.6	18.4
Humanities	4.36	1.01	4.23	0.94	4.32	1.13	128.5	20.9	129.7	14.2	133.0	16.1
Arts	4.38	0.98	4.45	0.95	4.57	1.14	132.0	22.8	138.1	15.9	141.2	17.8
Social science	4.27	1.03	4.35	1.05	4.48	1.06	125.7	16.1	129.4	14.1	133.8	15.6
Life sciences	4.28	0.98	4.33	0.76	4.39	0.98	130.9	21.9	136.4	15.8	138.1	17.2
Health sci and services	4.48	1.10	4.56	0.92	4.63	1.13	134.7	27.2	141.0	18.2	144.6	24.2
Physical sciences	4.43	1.17	4.35	1.00	4.44	0.92	133.7	25.6	135.7	13.2	140.9	15.7

NOTES: (1) Universe consists of all 12th graders who earned bachelor's degrees within 8.5 years of high school graduation, and for whom time-to-degree could be computed. Weighted Ns: Class of 1972 = 672k, Class of 1982 = 758k, Class of 1992 = 923k. (2) Time-to-degree in elapsed calendar years. (3) SD = standard deviation, means that 68 percent of the cases will fall ± the amount indicated from the mean. (3) Standard errors can be found in Appendix D.
SOURCES: National Center for Education Statistics: National Longitudinal Study of the High School Class of 1972, High School & Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Trends in Basic Access

The third most frequently asked question about postsecondary education in the United States concerns "access," which, in its broadest interpretation, means the rate at which a given segment of the population enrolls in any accredited institution offering instruction to adults (other than those devoted solely to Adult Basic Education) and/or to high school graduates. The segment of the population to which access analyses have traditionally been applied consists of recent (within the previous year), traditional-age (within the Census Bureau's 16-24 year-old bracket) high school graduates, including GED recipients. These data have been provided annually by the American College Testing Service (ACT) since 1960.

Table 2.4 looks across the three NCES longitudinal studies cohorts in terms of access rates, and compares those rates with the average of the rate reported by ACT during the life of each cohort. The ACT calculation is a snapshot of a single year, and includes people in the denominator (using the Census Bureau's 16-24 bracket) who did *not* complete all of their precollegiate education in the United States. The longitudinal studies, on the other hand, allow for members of a grade cohort to enroll in postsecondary education over a longer period of time—from 8.5 years for the Class of 1992 to 12 years for the Class of 1972, and confine the universe to U.S. high school students. Thus, the NCES cohort access rates will inevitably be higher than what ACT reports.

In table 2.4, one can see an increasing access rate for the general traditional-age population, and with a particularly notable leap between the Class of 1982 and the Class of 1992. This increase was consistent for women across all three cohorts, but for men it was significant only between the Class of 1982 and the Class of 1992. By race/ethnicity, the increases for Whites were significant across all three cohorts. For African-Americans and Latinos, the increases were significant—and substantial—only between the Class of 1982 and the Class of 1992.

In fact, considering access rates within the Class of 1992, there is no difference between Whites and African-Americans. There is also no difference between the access rates of Latinos and American Indians. Differences between all other combinations of race/ethnicity groups are significant.

In contrast to the portrait of access of 12th graders by race/ethnicity, table 2.4 reveals a consistent spread of 40 or more percentage points in access rates between students from the highest and lowest socioeconomic status (SES) quintiles in all three cohorts. Within SES quintiles, all increases in access across the cohorts are significant except that from the Class of 1972 to the Class of 1982 for the highest quintile.

Table 2.4. Percent of high school 12th graders in 1972, 1982, and 1992 who entered at least one postsecondary institution by the end of the cohort study period

	Class of 1972	Class of 1982	Class of 1992
Cohort study period:	**1972-1984**	**1982-1993**	**1992-2000**
All	57.9 (0.53)	63.3 (0.68)	77.3 (0.87)
Men	59.9 (0.71)	59.4 (0.93)	74.6 (1.26)
Women	55.8 (0.64)	67.2 (0.86)	79.9 (1.20)
Race/ethnicity			
White	59.8 (0.60)	66.2 (0.80)	79.4 (0.83)
African-American	50.6 (1.25)	53.3 (1.69)	69.5 (3.59)
Latino	50.9 (2.18)	49.7 (1.98)	70.0 (3.24)
Asian	76.1 (3.08)	79.9 (3.17)	91.4 (1.42)
American Indian	36.2 (3.61)	51.2 (5.54)	47.2 (10.2)
Socioeconomic status quintile			
81th-100th percentile (high)	85.2 (0.63)	87.7 (1.03)	93.8 (0.94)
61st-80th percentile	64.8 (0.89)	72.6 (1.23)	86.7 (1.40)
41st-60th percentile	54.2 (0.94)	64.4 (1.37)	77.0 (2.08)
21st-40th percentile	43.0 (0.93)	54.0 (1.42)	65.3 (2.05)
1st-20th percentile (low)	37.7 (0.91)	43.0 (1.69)	53.6 (2.41)
Average ACT access rate[1] during the life of the cohort, starting at the modal high school graduation year	54.7	57.7	63.5

[1] The American College Testing Program (ACT) computes college enrollment rates (access) of high school graduates in the population age 16-24 who graduated or completed a GED during the previous 12 months. The data here are drawn from Snyder, T., *Digest of Education Statistics, 2001* (Washington, DC: National Center for Education Statistics, 2002), table 184, p. 219.

NOTES: (1) Universes consist of all 12th graders in 1972, 1982, and 1992. Weighted Ns: Class of 1972 = 3.04M; Class of 1982 = 3.29M; Class of 1992 = 2.63M (2) Standard errors are in parentheses.
SOURCES: National Longitudinal Study of the High School Class of 1972; High School & Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

What the Class of 1992 Tells Us About Participation

Beneath the surface data on access and degree attainment lies a mass of information from the transcript studies that can help us understand better not only who participates in postsecondary education but how and what it might mean when people respond to surveys and indicate that they "went to college." This is an important issue, for example, in interpreting the Census data used by ACT in reporting college access rates (see table 2.4). Table 2.5 presents a "Macro History" of all 12th graders in the Class of 1992 cohort who reported attending a postsecondary institution by the time of their final interview in the Spring of 2000, and sets out a scheme that divides the quality of evidence in support of the students' claim in two bins: "weak" evidence of true participation and "adequate evidence" of true participation. For nearly 1 out of 12 students who claimed to have entered postsecondary education, the evidence in support of the claim was not adequate.

Transcripts were requested for all students who claimed to have attended postsecondary institutions, and were received for roughly 90 percent of them. But some of the received transcripts said simply that the student enrolled in a school yet never registered for courses; other transcripts indicated that the students attended one school and took one course or were enrolled only in continuing education courses such as parenting or Emergency Medical Training. Still others assembled records that consisted of nothing but GED-level and remedial work that did not carry credit toward a credential. Finally, there is a group that earned no credits of any kind in their postsecondary histories. One can argue that these students had "access," but did they truly participate in postsecondary education? If participation means earning at least some credits (or credit-equivalents) that count toward credentials, none of the cases cited yields evidence of participation.

What about students for whom transcripts were requested but not received (usually because the institution said they had no record of the student or could not find the document)? In some cases, the student's claim to attendance was supported by other unobtrusive information (e.g., entries of loan disbursements in the National Student Loan Data System files) or sets of test scores (e.g., Advanced Placement or College Board Achievement Tests) that matched the typical range of scores reported for the school they claimed to have attended. In other cases, the student's claim was supported by the consistency of responses to questions asked in surveys 6 years apart (1994 and 2000), and for features of postsecondary history—such as parents' borrowing for education, change of major, simultaneous attendance at two institutions, and program of study that matched their occupation in 1999—that offered a credible storyline.

But for other students for whom transcripts were requested but not received, there was no such evidence, unobtrusive or credible story-line. Readers of table 2.5 who focus on the summary lines ("Weak Evidence," "Adequate Evidence") and perform standard *t*-tests will notice statistically significant differences by both gender and race/ethnicity that warrant further exploration. What table 2.5 raises is a potentially important issue for the way national participation in postsecondary education might be assessed.

Table 2.5. Nature and extent of participation in postsecondary education for 1992 12th graders who reported attending a postsecondary institution at any time through December 2000, by gender and race/ethnicity

Percentage distribution of students by participation categories

	All	Men	Women	White	African-American	Latino	Asian
Weak evidence of participation							
All	**7.8 (0.58)**	**9.3 (1.01)**	**6.3 (0.61)**	**5.8 (0.42)**	**12.6 (2.90)**	**14.1 (3.10)**	**5.8 (2.06)**
Transcripts received							
1 school, no coursework	0.5 (0.13)	0.8 (0.26)	0.2 (0.06)	0.4 (0.12)	0.8 (0.41)	1.0 (0.83)	0.1 (0.12)
1 school, 1 course	1.3 (0.26)	1.6 (0.48)	1.0 (0.24)	1.1 (0.18)	2.3 (1.65)	1.8 (0.78)	0.1 (0.08)
1 school, all remedial work	1.6 (0.30)	2.0 (0.55)	1.2 (0.25)	0.8 (0.15)	4.6 (2.02)	2.7 (0.73)	0.9 (0.38)
1 school, continuing ed courses only	0.3 (0.11)	0.2 (0.06)	0.4 (0.20)	0.4 (0.15)	0.1 (0.08)	0.1 (0.08)	#
Zero credits from all schools attended	1.8 (0.20)	1.9 (0.35)	1.7 (0.23)	1.4 (0.17)	1.5 (0.37)	3.0 (0.87)	3.8 (2.04)
No transcripts received							
Self-reported history does not support claim	2.3 (0.39)	2.8 (0.69)	1.8 (0.39)	1.7 (0.27)	3.5 (1.39)	5.5 (2.93)	0.9 (0.35)
Adequate evidence of participation							
All	**92.2 (0.58)**	**90.7 (1.01)**	**93.7 (0.61)**	**94.2 (0.42)**	**87.4 (2.90)**	**85.9 (3.10)**	**94.2 (2.06)**
Transcripts received							
1 school, vocational coursework only	2.9 (0.26)	3.5 (0.34)	2.7 (0.32)	3.1 (0.31)	2.3 (0.59)	2.3 (0.69)	2.6 (1.19)
1 or more schools academic and other coursework	84.8 (0.79)	83.3 (1.13)	82.7 (0.89)	87.9 (0.60)	73.7 (4.14)	76.1 (3.29)	90.0 (2.28)
No transcripts received							
Self-reported history and/or unobtrusive evidence supports claim	4.5 (0.56)	3.9 (0.55)	6.3 (0.67)	3.2 (0.36)	11.4 (3.84)	7.5 (1.90)	1.6 (0.51)

Rounds to zero.

NOTES: (1) Universe=1992 12th graders who claimed postsecondary attendance. Weighted N = 2.19M. (2) For explanation of evidence used when no transcripts were received, see text. (3) Standard errors are in parentheses. (4) Columns may not sum to 100.0 percent because of rounding. **SOURCE:** NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Participation and Completion: Results of Changing the Denominator

Any statement about the proportion of a group of students who enrolls in postsecondary education of any kind (access), earns credits (or credit-equivalents) toward a credential (participation), or successfully finishes a given course of study and earns the award associated with that course of study (completion) is conditioned by the boundaries of the universe of students described—the denominator of the equation. Each narrowing of the universe and corresponding shrinkage in the denominator produces an increasingly fortuitous result. The differences in degree completion rates observed in tables 2.1 and 2.2 illustrate this principle. In both tables, the weighted number of 1992 12th graders who earned bachelors degrees (the numerator) is 924k. In table 2.1, the denominator consists of all those who earned more than 10 postsecondary credits: 1.898M. In table 2.2, the denominator consists of all those who not only earned more than 10 postsecondary credits but also any credits from a bachelor's degree-granting institution: 1.389M. The bachelor's degree completion rate thus rises from 48.7 percent (table 2.1) to 66.5 percent (table 2.2). But the universes in these tables were already confined to known postsecondary participants.

Tables 2.6 through 2.9 use the Class of 1992 cohort to demonstrate a different approach, namely, including those students who never claimed postsecondary attendance (that is, all participants in the 1992 panel and not just those flagged as 12th graders), hence including "access" in the equation. These tables also enable the researcher to begin investigation of secondary school background variables associated with postsecondary entry and completion.

Tables 2.6 and 2.7 should be compared to see what happens when moving from the broadest universe of the Class of 1992 cohort, that is, the maximum denominator, to a universe confined by the population of those who earned a standard high school diploma within a year of the modal high school graduation season of the Spring of 1992 (that is, by the end of June 1993[10]). With the more constricted universe:

- The proportion of those who never entered postsecondary education drops from 27.6 percent to 17.2 percent, and with an even steeper decline for Latinos (from 36.8 percent to 19.4 percent).
- The most notable increase in completion is at the level of bachelor's and higher. While not directly in the tables, these figures are 28.6 percent for all 1992 survey participants (s.e.= 0.88) and 35.2 percent for all 1992 survey participants who earned a standard high school diploma by July of 1993 (s.e.= 0.96).

Table 2.8 serves to unmask divergences in both postsecondary participation and degree completion by socioeconomic status quintile that are greater (between the highest and lowest quintiles) than the greatest differences by race/ethnicity (with the exception of participation rates for Asian-Americans versus American Indians) observable in table 2.7. Table 2.8 suggests that in multivariate analyses of postsecondary attainment, socioeconomic status is likely to play a significant role as an independent variable.

---

[10]The reason for setting this boundary is that, as previously noted, the NELS:88/2000 cohort was "refreshed" in both 1990 and 1992, and some slightly younger students entered the cohort on those occasions. These younger students accounted for 56 percent of the diplomas awarded between July 1992 and June 1993. In addition, some 16 percent of the diploma dates during this period fell during the Summer of 1992, indicating either delayed awards or delayed recording.

Table 2.9 introduces high school background variables that, at first glance, may also play significant roles in multivariate analyses of postsecondary attendance and attainment (Cabrera and La Nasa 2001; Adelman 1999b; Alexander, Holupka, and Pallas 1987). Students in the top two quintiles of academic high school curriculum intensity[11] have much higher rates of postsecondary participation and degree completion than students in the other quintiles, a phenomenon that is mirrored in the distribution of students by quintile of high school class rank/GPA.[12] Yet the internal variations in the two distributions suggest that their relative power in multivariate analyses may prove to be slightly different. For example, students in the lowest two quintiles of academic curriculum intensity were less likely to enter postsecondary education at all than were those students in the lowest two quintiles of the class rank/GPA measure. Only a multivariate analysis can sort out the effects of such cross currents and help researchers determine the comparative strength of precollegiate factors in explaining educational attainment.

[11]The academic intensity and quality of students' high school curriculum was developed from the NELS:88/2000 high school transcript records using the same cascading approach originally developed for the High School & Beyond/So cohort, and found in *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Completion* (Washington, DC: U.S. Department of Education, 1999). The cascade yielded 32 levels of intensity/quality, and the distribution of students across those levels was then set in quintiles. The variables on each level include: highest level of mathematics completed in high school, total Carnegie units in mathematics, core laboratory science (biology, chemistry, physics), foreign languages, English, social sciences (including history), computer science, number of Advanced Placement courses, and number of remedial courses in English and mathematics. At the highest of the 32 levels, the student has more than 1 Advanced Placement course, math at trigonometry, precalculus or calculus, more than 3.75 Carnegie units each of English and mathematics, more than 2 Carnegie units of core laboratory science, foreign language, and social sciences, any units of computer science, and no remedial courses (reading, English, or mathematics).

[12]Class rank (for the NELS:88/2000 students who attended high schools with more than10 students in a graduating class) was set in percentiles, and matched against the distribution of high school GPA set in percentiles. Missing percentile cases of class rank were then filled with the corresponding GPA percentile; using the equipercentile concordance method (Houston and Sawyer 1991), the final scale was then presented in quintiles.

Table 2.6. Participation in postsecondary education and highest degree earned through December 2000 by 1992 NELS:88/2000 survey participants, by gender and race/ethnicity

	All	Men	Women	White	African-American	Latino	Asian	American Indian
No post-secondary	27.6 (0.94)	30.1 (1.33)	25.0 (1.22)	25.4 (1.01)	31.2 (2.87)	36.8 (2.90)	11.6 (2.50)	59.5 (8.91)
Highest degree								
No degree	34.5 (0.87)	36.3 (1.30)	32.8 (1.11)	31.4 (0.87)	45.3 (3.21)	43.0 (2.87)	33.5 (3.40)	32.9 (8.15)
Certificate	3.7 (0.29)	2.9 (0.34)	4.6 (0.47)	3.9 (0.36)	3.2 (0.71)	3.5 (0.73)	3.8 (1.35)	0.4 (0.32)
Associate's	5.5 (0.33)	5.1 (0.48)	5.9 (0.46)	6.1 (0.41)	3.6 (0.84)	4.4 (0.85)	6.7 (2.50)	2.1 (0.72)
Bachelor's	19.9 (0.68)	18.3 (0.89)	21.4 (0.89)	23.0 (0.78)	13.1 (1.80)	7.9 (0.88)	29.1 (2.94)	3.6 (1.69)
Post-bacca-laurate coursework	2.2 (0.18)	1.9 (0.27)	2.4 (0.22)	2.6 (0.23)	0.5 (0.19)	1.2 (0.51)	3.4 (0.69)	0.9 (0.59)
Incomplete graduate degree	3.0 (0.19)	2.6 (0.27)	3.4 (0.30)	3.4 (0.25)	1.9 (0.52)	2.0 (0.56)	4.9 (0.83)	0.2 (0.17)
Master's	2.8 (0.21)	2.1 (0.22)	3.5 (0.28)	3.4 (0.28)	1.0 (0.26)	1.1 (0.27)	2.7 (0.56)	0.5 (0.54)
1st profess. or Ph.D	0.8 (0.11)	0.8 (0.13)	0.8 (0.14)	0.9 (0.11)	0.2 (0.08)	0.3 (0.10)	4.3 (1.85)	0.1 (0.06)

NOTES: The universe consists of all 1992 survey participants who were in the 2000 follow-up of the NELS:88/2000 cohort, including those who never graduated from high school and those who earned GEDs and alternative secondary school diplomas. Weighted N = 3.15M. (2) Columns may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 2.7. Participation in postsecondary education and highest degree earned through December 2000 by 1992 NELS:88/2000 survey participants who earned standard high school diplomas by July 1993, by gender and race/ethnicity

	All	Men	Women	White	African-American	Latino	Asian	American Indian
No post-secondary	17.2 (0.77)	20.2 (1.15)	14.1 (0.97)	16.5 (0.78)	19.8 (2.74)	19.4 (3.10)	5.7 (1.28)	51.2 (10.7)
Highest degree								
No degree	37.2 (0.91)	39.6 (1.35)	34.8 (1.15)	32.9 (0.85)	51.0 (3.61)	52.9 (2.99)	35.0 (3.36)	38.2 (9.84)
Certificate	3.9 (0.33)	3.0 (0.34)	4.9 (0.55)	4.0 (0.38)	3.6 (0.89)	3.9 (0.98)	4.1 (1.46)	0.6 (0.48)
Associate's	6.4 (0.38)	5.7 (0.52)	7.1 (0.57)	6.9 (0.46)	3.8 (0.85)	6.1 (1.23)	7.2 (2.77)	3.1 (1.05)
Bachelor's	24.5 (0.75)	22.5 (1.03)	26.4 (0.99)	27.4 (0.84)	17.2 (2.27)	11.2 (1.28)	31.5 (3.10)	5.5 (2.57)
Post-bacca-laureate coursework	2.7 (0.21)	2.4 (0.33)	3.0 (0.27)	3.1 (0.27)	0.7 (0.25)	1.7 (0.73)	3.7 (0.74)	0.3 (0.25)
Incomplete graduate degree	3.7 (0.25)	3.2 (0.33)	4.3 (0.37)	4.1 (0.30)	2.5 (0.67)	2.8 (0.85)	5.3 (0.88)	0.2 (0.25)
Master's	3.4 (0.25)	2.5 (0.33)	4.3 (0.36)	4.1 (0.33)	1.3 (0.35)	1.5 (0.38)	2.9 (0.60)	0.8 (0.81)
1st profess or Ph.D	1.0 (0.14)	0.9 (0.14)	1.1 (0.22)	1.1 (0.13)	0.2 (0.11)	0.4 (0.15)	4.6 (1.99)	0.1 (0.09)

NOTES: (1) The universe consists of all 1992 survey participants who were in the 2000 follow-up of the NELS:88/2000 cohort who earned a standard high school diploma within 1 year (and 1 month, to account for delayed awards) following the modal date of cohort high school graduation. Weighted N = 2.51M. (2) Columns may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 2.8. Participation in postsecondary education and highest degree earned through December 2000 by 1992 NELS:88/2000 survey participants who earned standard high school diplomas by July 1993, by socioeconomic status percentile

	Socioeconomic status percentile				
	(High) 81st-100th	61st-80th	41st-60th	21st-40th	(Low) 1st-20th
No postsecondary	3.4 (0.72)	9.1 (1.02)	17.3 (1.54)	28.8 (2.13)	36.5 (2.39)
Highest degree					
No degree	23.4 (1.42)	42.2 (1.85)	42.5 (2.04)	40.0 (1.88)	41.2 (2.31)
Certificate	1.4 (0.38)	3.5 (0.73)	4.6 (0.66)	4.7 (0.90)	7.3 (1.15)
Associate's	3.7 (0.54)	6.2 (0.84)	9.3 (1.01)	7.8 (0.92)	6.2 (1.06)
Bachelor's	43.9 (1.51)	28.9 (1.53)	19.2 (1.38)	13.7 (1.04)	6.5 (0.76)
Post-baccalaureate coursework	5.0 (0.57)	2.7 (0.51)	2.3 (0.38)	1.4 (0.38)	0.6 (0.17)
Incomplete graduate degree	8.1 (0.58)	3.3 (0.44)	2.5 (0.36)	2.0 (0.72)	1.4 (0.56)
Master's	8.1 (0.77)	3.3 (0.49)	2.0 (0.34)	1.4 (0.26)	0.3 (0.12)
1st professional or Ph.D	3.0 (0.48)	0.8 (0.19)	0.3 (0.10)	0.3 (0.10)	#

Rounds to zero.
NOTES: (1) The universe consists of all 1992 survey participants who were in the 2000 follow-up of the NELS:88/2000 cohort who earned a standard high school diploma within 1 year (and 1 month, to account for delayed awards) following the modal date of cohort high school graduation. Weighted N = 2.547M. (2) Columns may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 2.9. Participation in postsecondary education and highest degree earned through December 2000 by 1992 NELS:88/2000 survey participants who earned standard high school diplomas by July 1993, by high school academic curriculum intensity and academic performance

	Percentage distribution by academic curriculum intensity quintile[1]				
	Highest	2nd	3rd	4th	Lowest
No postsecondary	2.9 (1.02)	3.5 (0.88)	11.4 (1.45)	25.4 (1.91)	43.6 (2.48)
Highest degree					
No degree	16.6 (1.54)	31.8 (2.83)	42.9 (1.82)	46.9 (2.16)	39.9 (2.07)
Certificate	0.7 (0.22)	2.4 (0.90)	5.5 (0.93)	5.9 (0.94)	6.0 (0.84)
Associate's	2.8 (0.42)	6.1 (0.82)	9.5 (1.05)	8.9 (0.94)	5.2 (0.73)
Bachelor's	49.7 (1.97)	39.1 (2.11)	23.2 (1.41)	10.2 (1.21)	3.8 (0.57)
Post-baccalaureate coursework	4.5 (0.52)	4.8 (0.79)	2.3 (0.54)	0.8 (0.20)	0.6 (0.18)
Incomplete graduate degree	8.9 (0.91)	5.9 (0.65)	2.4 (0.50)	1.2 (0.46)	0.7 (0.28)
Master's	9.7 (1.19)	5.1 (0.61)	2.5 (0.42)	0.5 (0.20)	0.2 (0.11)
1st profess or Ph.D	4.2 (0.75)	1.3 (0.30)	0.2 (0.10)	0.1 (0.05)	#
	Percentage distribution by high school class rank/GPA quintile[1]				
	Highest	2nd	3rd	4th	Lowest
No postsecondary	3.0 (0.65)	9.8 (1.53)	15.3 (1.75)	19.7 (1.65)	36.5 (2.53)
Highest degree					
No degree	16.1 (1.28)	26.7 (1.73)	41.2 (2.25)	48.7 (2.12)	47.6 (2.38)
Certificate	1.2 (0.28)	3.7 (1.12)	5.2 (0.97)	5.4 (0.82)	5.0 (0.66)
Associate's	4.3 (0.57)	9.4 (1.27)	8.1 (0.85)	8.4 (1.10)	4.0 (0.53)
Bachelor's	45.3 (1.69)	37.3 (1.91)	22.3 (1.58)	14.9 (1.30)	5.9 (0.99)
Post-baccalaureate coursework	5.6 (0.80)	3.8 (0.49)	2.3 (0.56)	1.0 (0.30)	0.3 (0.11)
Incomplete graduate degree	9.3 (0.82)	5.2 (0.83)	3.2 (0.62)	1.0 (0.24)	0.4 (0.14)
Master's	10.8 (1.05)	3.4 (0.46)	2.2 (0.40)	0.8 (0.27)	0.2 (0.10)
1st profess or Ph.D	4.5 (0.68)	0.7 (0.19)	0.3 (0.12)	0.1 (0.09)	#

Rounds to zero.

[1] See the Glossary for a description of the construction of these variables.

NOTES: (1) The universe consists of all 1992 survey participants who were in the 2000 follow-up of the NELS:88/2000 cohort who earned a standard high school diploma within 1 year (and 1month, to account for delayed awards) following the modal date of cohort high school graduation. Weighted Ns for those with curriculum data = 2.07M, and class rank/GPA data = 1.95M. (2) Columns may not sum to 100 percent because of rounding. (3) Standard errors are in parentheses.

SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Part 3:
The "Credit-Attainment" Account of Postsecondary Accomplishment

Up to this point, *Principal Indicators* has presented attainment in terms of credentials awarded, including the category of "no degree." A closer examination of the data, however, yields a richer description of what is meant by "no degree," and this description leads us to consider a variety of post-matriculation behaviors, including attendance patterns, that may assist in the targeting of populations for enhanced retention efforts.

Table 3.1 presents the attainment portrait for *all* postsecondary participants in the Class of 1992 cohort in an "if-then-else" logic that begins with students who earned at least a bachelor's degree, and then works down the credential chain through associate's degrees and certificates to "no degree," which it then divides by the number of credits earned by the student. Four credit ranges are set forth: 0-10, 11-29, 30-59, and 60 or more. For convenience of labeling, this is called a "credit-attainment account."

Two of the no degree credit-range groups are of particular interest and present distinctive profiles: incidental students (0-10 credits) and long-term noncompleters (60 or more credits). In terms of general demographic background characteristics (table 3.1), higher proportions of African-American and Latino students than White students and those from the lowest two SES quintiles versus the highest two SES quintiles are found in the incidental student category, but neither of these features is the case in the long-term noncompleter category. As tables 3.2 and 3.3 suggest, though, demographic background may prove to be less important than other features of secondary school history and postsecondary attendance in explaining why, at age 26 or 27, the two groups are situated where they are in the credit-attainment chain.

The portrait of those who became incidental students in table 3.2 shows not only an academically weaker group than their peers (for example, more than half never got beyond Algebra 1 in high school mathematics) but also a group whose precollegiate expectations for educational attainment[13] were considerably lower than those whose momentum in postsecondary education carried them beyond the "incidental" classification.

Policy discussions and research tend to treat all noncompleters as equivalent, whether they earned 1 credit or 71 credits. The more notable exceptions do not involve credit accounting, but reflect the fact that the student is still enrolled at the end of a longitudinal study (e.g., Berkner, He, and Cataldi 2002). The importance of tables 3.1 through 3.3 is that they demonstrate the difference between still being enrolled and momentum toward a degree.

---

[13]The "educational anticipations" variable was constructed from student responses to questions asked in 1990 and 1992 about the highest level of education they expected to attain and their planned timing of entry into postsecondary education, and a question asked in1992 about the type of institution the student intended to enter first. A student with a consistent anticipation of earning a bachelor's degree or higher answered the basic pair of questions in 1990 and 1992 by citing expectations of bachelor's or higher and immediate entry to higher education after high school. The 1992 question about type of first institution was used to adjust missing or contradictory responses. An algorithm involving other combinations of responses to the two basic questions produced the remaining values of the variable (see the Glossary for complete description).

Table 3.1. Educational attainment of 1992 12th graders who subsequently entered postsecondary education, through December 2000, in terms of 'credit attainment,' by race/ethnicity, gender, and socioeconomic status

Percent of students by highest number of credits or credential earned

	No degree 0-10 cr	No degree 11-29 cr	No degree 30-59 cr	No degree but at least 60 cr	Certificate high	Associate's high	Bachelors' or higher	Percent of total in group
All	**12.2** (0.69)	**11.6** (0.71)	**8.9** (0.56)	**10.1** (0.55)	**5.0** (0.43)	**8.1** (0.50)	**44.1** (1.08)	
Race/ethnicity								
White	9.7 (0.65)	10.2 (0.74)	8.4 (0.55)	9.6 (0.59)	5.0 (0.50)	8.6 (0.58)	48.6 (1.13)	**74.2 (1.32)**
African-American	20.5 (3.57)	17.5 (3.28)	10.9 (2.42)	10.3 (1.84)	5.2 (1.22)	4.9 (1.11)	30.7 (3.31)	**10.5 (0.90)**
Latino	19.8 (2.26)	19.5 (2.53)	11.9 (2.10)	11.8 (2.30)	5.2 (1.27)	8.3 (1.73)	23.5 (2.52)	**9.4 (0.91)**
Asian	11.4 (3.10)	5.9 (1.17)	5.2 (1.09)	14.6 (3.66)	4.3 (1.50)	7.6 (3.03)	51.0 (4.30)	**5.0 (0.47)**
American Indian	32.1 (10.8)	11.0 (3.40)	25.0 (11.0)	7.4 (3.92)	1.3 (1.02)	6.6 (3.24)	16.6 (5.32)	**0.8 (0.25)**
Gender								
Men	12.5 (1.05)	12.7 (1.07)	9.8 (0.89)	12.8 (0.96)	3.9 (0.46)	7.5 (0.70)	40.9 (1.49)	**46.8 (0.93)**
Women	11.9 (0.90)	10.7 (0.89)	8.2 (0.67)	7.7 (0.59)	5.9 (0.68)	8.7 (0.69)	47.0 (1.32)	**53.2 (0.93)**
SES quintile								
81st - 100th percentile (high)	3.0 (0.44)	4.9 (0.77)	4.7 (0.58)	10.4 (1.11)	1.5 (0.42)	4.0 (0.60)	71.6 (1.56)	**29.1 (1.08)**
61st - 80th percentile	11.3 (1.53)	12.4 (1.70)	10.1 (1.17)	11.7 (1.27)	3.9 (0.85)	6.9 (0.95)	43.6 (1.92)	**25.3 (0.88)**
41st - 60th percentile	16.5 (1.78)	14.0 (1.50)	9.2 (0.86)	9.6 (1.07)	5.5 (0.79)	11.9 (1.29)	33.3 (1.78)	**20.2 (0.73)**
21st - 40th percentile	19.3 (1.66)	14.0 (1.61)	11.5 (1.46)	9.3 (0.86)	6.8 (1.31)	11.4 (1.32)	27.7 (1.77)	**15.4 (0.61)**
1st - 20th percentile (low)	19.9 (2.91)	19.4 (2.39)	13.0 (2.37)	7.3 (1.13)	13.6 (2.04)	11.1 (1.93)	15.7 (1.86)	**10.0 (0.73)**

NOTES: (1) The universe consists of all 1992 12th graders who became postsecondary participants. Weighted N = 2.09M. (2) Rows may not sum to 100.0 percent because of rounding. (3) Column sub-population percentages for "percent of total in group" may not sum to 100.0 percent because of rounding. (4) "Certificate High" means that the student's highest attained degree was a certificate; "Associate's High" means that the student's highest attained degree was the associate's. (5) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

In terms of postsecondary attendance

- only 57 percent of those who became incidental students (versus 86 percent of their peers) entered directly following high school graduation;
- 66 percent of incidental students (versus 5 percent of nonincidental students) were enrolled for less than 1 year; and
- in the last year (2000) of the Class of 1992 history, only 8 percent of incidental students were still enrolled versus 22 percent of nonincidental students.

As an open door institution, the community college was the initial host to three-quarters of those who became incidental students. Researchers and administrators interested in the ways in which community colleges can identify those students in the "incidental student profile" who have the best chance of succeeding are encouraged to use the NELS:88/2000 files to help determine (1) which features of student history seem to be the most significant barriers, and (2) which of those features can be addressed by practical local initiatives. State-system studies, such as that in Washington state (Steppanen 2000), have shown that a measurable proportion of entering students plans to stay for fewer than 10 credits and that half of that group fulfills its plans—factors of cohort history that cannot be pursued with the NELS:88/2000 but are worthy of consideration.

Table 3.2. Percent of 1992 12th graders who became incidental postsecondary students versus those who became nonincidental postsecondary students, by demographic and academic history characteristics: 1992-2000

	Incidental (0-10 credits)	Nonincidental (More than 10 credits)
Proportion of all students	**12.2 (0.69)**	**87.8 (0.69)**
Had children by 1992	6.3 (1.58)	1.9 (0.44)
High school diploma		
None	0.1 (0.06)	0.1 (0.04)
Standard	91.4 (2.05)	98.3 (0.43)
GED	8.0 (2.01)	1.4 (0.41)
Certificate of attendance	0.5 (0.41)	0.2 (0.12)
Urbanicity of high school		
Urban	33.1 (3.35)	27.8 (1.51)
Suburban	36.1 (3.17)	43.8 (1.80)
Rural	30.8 (2.87)	28.4 (2.87)

See notes at end of table.

Table 3.2. Percent of 1992 12th graders who became incidental postsecondary students versus those who became nonincidental postsecondary students, by demographic and academic history characteristics: 1992-2000–Continued

	Incidental	Nonincidental
Months between high school graduation and postsecondary entry		
0-7	57.2 (3.12)	86.4 (0.78)
8-20	16.9 (2.39)	7.2 (0.65)
More than 20	25.9 (2.74)	6.4 (0.47)
At least one GED-level postsecondary transcript[1]	17.1 (2.63)	0.7 (0.12)
Type of 1st institution of attendance		
Doctoral	4.7 (0.89)	26.5 (0.97)
Other 4-year	14.8 (2.82)	32.9 (0.93)
Community college	75.1 (2.98)	35.9 (1.11)
Other sub-baccalaureate	5.3 (1.34)	4.7 (0.38)
Continuity of enrollment		
Continuous	12.0 (1.91)	73.3 (0.93)
Stop-out after 3 years of continuous	NA[2]	4.0 (0.38)
Noncontinuous	22.3 (2.70)	17.8 (0.80)
Enrolled for less than 1 year	65.7 (3.07)	4.9 (0.40)
Not enrolled in 2000 (last year of tracking)	92.1 (2.10)	77.6 (0.74)
High school academic curriculum intensity quintile[1]		
Highest	2.6 (0.75)	25.3 (1.01)
2nd	10.0 (2.59)	25.6 (0.92)
3rd	22.5 (2.69)	22.2 (0.86)
4th	38.4 (3.37)	17.3 (0.84)
Lowest	26.5 (2.49)	9.6 (0.60)
High school class rank/GPA quintile[1]		
Highest	3.6 (1.01)	27.9 (0.92)
2nd	13.0 (3.00)	22.1 (0.81)
3rd	18.9 (2.18)	21.2 (0.81)
4th	22.0 (2.50)	17.3 (0.86)
Lowest	42.6 (3.46)	11.5 (0.63)

See notes at end of table.

Table 3.2. Percent of 1992 12th graders who became incidental postsecondary students versus those who became nonincidental postsecondary students, by demographic and academic history characteristics: 1992-2000–Continued

	Incidental	Nonincidental
Highest mathematics in high school		
Calculus	1.9 (0.66)	13.9 (0.67)
Precalculus	1.8 (0.47)	15.6 (0.93)
Trigonometry	6.6 (2.54)	14.0 (0.79)
Algebra 2	27.3 (2.64)	32.0 (1.05)
Geometry	20.9 (2.89)	13.3 (0.74)
Algebra 1	29.8 (2.92)	9.1 (0.59)
Less than Algebra 1	11.8 (1.80)	2.2 (0.33)
Consistency and level of educational expectations, 1990-1992[3]		
Bachelor's consistent	24.3 (2.72)	60.3 (1.04)
Raised to bachelor's	15.9 (2.18)	13.0 (0.62)
Lowered from bachelor's	21.3 (2.00)	11.6 (0.69)
Raised to some college	15.3 (2.07)	4.2 (0.34)
Consistent sub-baccalaureate	17.0 (3.10)	9.4 (0.67)
No college plans	6.2 (1.37)	1.6 (0.28)

[1]See the Glossary for a description of these variables.
[2] Not applicable: none of the incidental students was enrolled for 3 years.
[3] Based on questions asked in the 10th grade (1990) and 12th grade (1992) follow-up surveys.
NOTES: (1) Maximum weighted Ns in cross-tabs: Incidental Students (Weighted N = 254k); Nonincidental Students (Weighted N = 1.84M); (2) Columns for variables with multiple values may not sum to 100.0 percent because of rounding; (3) standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

The case of the long-term noncompleters, those who earned 60 or more credits but no degree, may be important to institutions seeking to improve their degree completion rates. Students who have reached this level of "credit retention," one can hypothesize, have the momentum to complete degrees. Table 3.3 lays out some of the factors that analysts might consider in testing this hypothesis. More accurately, the table suggests some of the variables that could be used in a quasi-experimental design, based on the Class of 1992 data, that could help identify the factors associated with completion starting at the level of 60 credits.

Table 3.3 compares the 60+ group with those students who earned associate's or bachelor's degrees. The following are some highlights of the comparison:

- The 60+ population is more likely to start its postsecondary career in a community college than those who completed degrees (40 percent vs. 24 percent),

and to attend more than one institution (74 percent vs. 59 percent). Indeed, a third of the long-term noncompleters attended more than two institutions.

- The 60+ population presents a weaker academic performance record starting with the academic intensity of its high school curriculum,[14] and continuing with a significant percentage (42) of its members earning 20 or fewer credits during their first calendar year of attendance (versus 15 percent of those who earned degrees).
- The gap between noncompleters and completers in the proportion who were continuously enrolled is also notable, as is the proportion of noncompleters who withdrew from more than 12 credits of academic work (38 percent vs. 11 percent of completers).

Low credit production in the first year of enrollment, noncontinuous enrollment, and a notable use of nonpenalty course withdrawals, one hypothesizes, slow progress toward any degree. But, as table 3.3 reveals, over one-third of the long-term noncompleters were persisting in the final year (2000) of the Class of 1992 history.

Notably, 26 percent of the 60+ group was enrolled in candidacy for the bachelor's degree, and 4.3 percent (about a fifth of this group) were judged likely to earn the bachelor's within the following year. To meet the threshold criteria for the variable "BALIKELY" (likely bachelor's degree by December 2001) students were enrolled in 2000 with more than 90 earned credits, carried a GPA of 2.75 or higher, and had a major indicated on their current transcript. Telephone calls to registrars in the course of data file construction confirmed that some of these students had, in fact, earned degrees in 2001, but they could not be credited with the degree in the Class of 1992 files because the date of award fell after the closing date of the study.

In addition, 6 percent of the 60+ group had already met the criteria for an associate's degree: (1) earned more than 65 credits from a community college, (2) earned credits in English composition, (3) earned credits in at least college-level mathematics and each of the major disciplinary areas (humanities/arts, social sciences, and sciences) or presented an occupationally oriented program with more than 20 credits in an occupational field such as allied health sciences/services, and (4) held a GPA of 2.50 or higher. This phenomenon of the associate's degree eligible (but no degree) student was developed and refined in light of presentations by and discussions with community college administrators (Garber 2002). Their explanations of how this phenomenon arises (some students are not aware that they qualified for the degree or had not filed the appropriate paper work; others have qualified academically but have not met local physical education requirements or have unfulfilled financial obligations to the school; and still others are more interested in transferring than earning the associate's credential) cannot be tested with the NELS:88/2000 data.

[14]With the exception of the 2nd highest quintile in the distribution of high school academic curriculum intensity, the percentage of those from the 60 or more credit group was lesser at the higher levels and greater at the lower levels than that for those who earned associate's and/or bachelor's degrees.

Table 3.3. Percent of 1992 12th graders who earned 60 or more postsecondary credits but no degree, compared with those who earned associate's and/or bachelor's degrees, by selected characteristics of academic history: 1992-2000

	60 or more credits no degree	Associate's and/or bachelor's
All	**16.2 (0.84)**	**83.8 (0.84)**
Months between high school graduation and college entry		
0-7	87.6 (1.66)	94.1 (0.65)
8-20	6.8 (1.44)	3.9 (0.58)
More than 20	5.6 (0.85)	2.0 (0.31)
High school academic curriculum intensity quintile		
Highest	16.8 (1.87)	35.4 (1.31)
2nd	24.8 (3.18)	29.5 (1.10)
3rd	24.8 (2.33)	19.6 (0.97)
4th	24.3 (2.77)	11.2 (0.88)
Lowest	9.3 (1.33)	4.4 (0.48)
Type of 1st institution		
Doctoral	24.0 (2.13)	35.6 (1.25)
Other 4-year	33.8 (2.54)	38.4 (1.17)
Community college	40.3 (2.85)	23.9 (1.20)
Other sub-baccalaureate	1.9 (0.53)	2.1 (0.32)
Number of schools attended		
One	25.6 (2.13)	40.8 (1.22)
Two	40.7 (3.05)	36.0 (1.11)
More than two	33.7 (2.99)	23.2 (1.08)
Credits earned in 1st calendar year of attendance		
0-10	18.9 (2.95)	4.2 (0.54)
11-20	23.1 (1.93)	10.8 (0.79)
21-28	34.7 (2.50)	32.6 (1.11)
More than 28	23.3 (2.11)	52.4 (1.20)

See notes at end of table.

Table 3.3. Percent of 1992 12th graders who earned 60 or more postsecondary credits, but no degree, compared with those who earned associate's and/or bachelor's degrees, by selected characteristics of academic history: 1992-2000-continued

	60 or more credits no degree	Associate's and/or bachelor's
Credits in courses from which the student withdrew		
0	16.3 (1.61)	45.7 (1.28)
1-6	26.6 (2.24)	29.5 (1.03)
7-12	18.0 (1.76)	14.2 (0.85)
13-19	17.6 (1.85)	6.5 (0.59)
20 or more	20.5 (1.95)	4.1 (0.52)
Continuity of enrollment		
Continuous	55.9 (2.73)	88.6 (0.74)
Stop-out after 3 years of continuous	13.0 (1.61)	2.5 (0.27)
Noncontinuous	27.8 (2.60)	7.9 (0.68)
Indeterminable	3.3 (1.24)	1.0 (0.30)
Trend in GPA from 1st year through 2nd year to final term		
Rising	24.2 (2.83)	39.7 (1.14)
Flat	51.8 (2.94)	42.7 (1.15)
Declining	24.0 (2.01)	17.6 (0.97)
In-school status in 2000		
Graduate student	#	13.5 (0.82)
Bachelor's candidate	26.1 (2.37)	1.9 (0.33)
Associate's candidate	8.1 (1.08)	#
Other undergraduate	1.8 (0.48)	1.1 (0.21)
Not in school	63.9 (2.62)	83.4 (0.89)
Planned enrollment in 2001	67.5 (3.12)	49.6 (1.23)
Bachelor's likely by Dec., 2001	4.3 (0.81)	0.3 (0.09)
Eligible for associate's degree but no degree awarded	5.9 (1.70)	†

Rounds to zero.
† Not applicable.
NOTES: (1) Columns for variables with multiple values may not sum to 100.0 percent because of rounding. (2) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

One of the most significant contrasts between the 60+ group and those who earned associate's or bachelor's degrees lies in noncontinuous enrollment, commonly termed "stop-out." Not every departure from higher education is permanent (Horn 1998), but continuous enrollment — even for minimal amounts of earned credit — is strongly associated with degree completion (Adelman 1999b). Longitudinal studies that continue as long as that of the Class of 1992 (8.5 years from the modal year of postsecondary entry, 1992), the Class of 1982 (11 years), and the Class of 1972 (12 years), require greater latitude in the definition of stop-out than do shorter term studies (e.g., the 5-year Beginning Postsecondary Students study of 1989-1994 (BPS:90/94). For all three grade-cohort longitudinal studies, the threshold of noncontinuous enrollment was *more than* one semester (or two quarters), excluding summer terms. And if a student stopped out for one semester (or two quarters) more than once, the student's enrollment was considered noncontinuous. In examining the Class of 1992 transcripts, a different type of noncontinuous enrollment pattern was noted: from the term of first attendance, the student was continuously enrolled for at least three full academic years *before* the first stop-out period occurred. One out of eight of the 60+ students evidence this timing of stop-out, and, as event-history analyses of the longitudinal studies point out, timing may override other factors in explaining degree completion (DesJardins, McCall, Ahlburg, and Moye 2002).

First-to-Second Year Retention

The vocabulary of studies of postsecondary student histories is not always consistent in labeling the phenomenon of year-to-year continuous enrollment. Whether the phenomenon is termed "persistence" or "retention," it has been a persistent concern of researchers and policymakers for three decades (Astin 1975; Dey and Astin 1989; Tinto 1987; Smith 1998), and usually with a focus on *institutional* retention of an entering class to the second year. The question regarding retention is customarily phrased: What proportion of students who started out at an institution in the fall term of year X is enrolled at the same institution in the fall term of year X+1?

Table 3.4, based on the Class of 1992 history, is designed to cast light on this question from a different perspective, one that recognizes that not all beginning students start out in the fall term or return in the fall term, and that some students are in programs of less than 1 year duration. The table is focused on the student, not the institution, and hence answers the question within the panorama of all institutions in which the student enrolls. As one of the reviewers of this document added, "since most institutions count transfers [out] as 'noncompleters' in their retention statistics, this view of transfers from a cohort perspective can be [a] useful [corrective]."

The algorithm that produces table 3.4 uses an academic calendar year (defined as July 1 through June 30) as a frame. It flags the academic year in which the student's first term date of attendance at his/her true first institution falls. It then asks whether the student was enrolled *at any time* during the following academic year. If that condition was met, the student exhibited a threshold degree of *systemwide retention.* Among the students who did *not* meet the threshold criterion, however, are a small group who earned certificates in less-than-1-year programs during their first year of attendance. This group is separated from the larger populations who were retained or not retained.

Table 3.4. Retention from first to second year of postsecondary education of 1992 12th graders who entered postsecondary education at any time, 1992-2000: Percent of students retained and not retained from year one to year two, and who completed one-year certificate programs

	Retained	1-year certificates	Not retained
All	**88.1 (0.64)**	**0.9 (0.13)**	**11.0 (0.62)**
Proportion who returned to PSE after the *second* year	**89.9 (0.71)**	**24.6 (7.02)**	**23.8 (2.50)**
Type of 1st institution (rows add to 100 percent)			
Doctoral	97.4 (0.44)	#	2.6 (0.43)
Other 4-year	92.8 (1.01)	#	7.2 (1.01)
Community college	81.6 (1.23)	0.4 (0.09)	18.0 (1.22)
Other sub-baccalaureate	71.0 (3.10)	14.8 (2.51)	14.2 (2.10)
Type of 1st institution (columns add to 100 percent)			
Doctoral	26.7 (0.99)	1.3 (1.11)	5.8 (0.99)
Other 4-year	32.7 (0.94)	3.0 (1.71)	20.6 (2.71)
Community college	36.8 (1.15)	15.7 (4.20)	67.2 (2.80)
Other sub-baccalaureate	3.8 (0.37)	80.0 (4.63)	6.4 (1.00)
Credits earned in 1st year (columns add to 100 percent)			
0-10	16.8 (0.90)	26.2 (6.83)	70.7 (2.41)
11-20	18.3 (0.87)	11.9 (5.03)	19.2 (1.94)
21-28	27.9 (0.88)	12.6 (3.78)	7.7 (1.43)
More than 28	37.0 (0.98)	49.3 (7.20)	2.4 (0.58)
High school academic curriculum intensity quintile[1] (columns add to 100 percent)			
Highest	25.7 (1.04)	1.8 (1.42)	4.6 (0.94)
2nd	25.3 (0.94)	12.3 (7.48)	15.2 (3.12)
3rd	22.5 (0.88)	15.7 (5.20)	20.8 (2.23)
4th	17.1 (0.86)	42.9 (8.58)	35.2 (3.27)
Lowest	9.3 (0.61)	27.2 (6.19)	24.2 (2.24)

Rounds to zero.

[1] See the Glossary for an elaboration of this variable.

NOTES: (1) The universe consists of all 1992 12th graders who became postsecondary participants. Weighted N = 2.04M. (2) Standard errors are in parentheses. (3) For detail above the line, rows may not sum because of rounding; for detail below the line, columns may not sum because of rounding.

SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Defined in this manner, the reader will note that the systemwide retention rate is higher for those who began in doctoral degree-granting institutions than it was for those who began in other 4-year colleges, and that these rates are higher than for those who began in community colleges, which, in turn, are higher than for those who first attended other sub-baccalaureate institutions. The case of other sub-baccalaureate institutions, though, must be judged in light of the fact that 15 percent of students who start out in those institutions earn 1-year certificates within the first year of attendance.

Perhaps more important than the fact of first to second year retention is the quality of retention. While there may be many measures of quality of first year academic performance, the proxy chosen for table 3.4 is total credits earned during that period. Among those who were retained, 35 percent earned 20 or fewer credits, an amount that has been demonstrated to have a distinctly negative relationship to degree completion (Adelman 1999b). Not surprisingly, among those who were not retained, 90 percent earned 20 or fewer credits in the first calendar year of attendance.

A second dimension of retention quality, particularly given the definition of systemwide retention used in table 3.4, is continuous enrollment. That is, it is possible for a student to have been enrolled in the fall semester of 1992, not enrolled again until the spring semester of 1994 and still be considered "retained" under the definition used here. As has been noted above, in the transcript-based postsecondary histories of NCES grade-cohort longitudinal studies, non-continuous enrollment is defined as any stop-out period exceeding one semester (or its equivalent), exclusive of summer terms (see Glossary); and continuity of enrollment has been demonstrated to have a very positive relationship with degree completion (Carroll 1989, Horn 1998, Adelman 1999b). In the example used, the stop-out period was two semesters. While not in table 3.4, some 25.1 percent (s.e.= 0.96) of those who were retained exhibited noncontinuous enrollment at some time in their undergraduate careers. If a student's year-1 to year-2 retention includes noncontinuous enrollment, momentum toward degree completion may be weakened.

Table 3.4 invites researchers to explore these and other dimensions of the quality of retention, not only from the first to second year, but beyond. Indeed, table 3.4 extends beyond first-to-second year retention to provide some indication of the degree to which students who did not enroll in the second year following postsecondary entry return to school at a later point in time. For example, 24 percent of the students who were not retained from year one to year two reappeared in the postsecondary system in the third or later year. Even among the small group of those who earned a certificate in their first year of postsecondary education and who did not enroll at any time during the second year, 25 percent came back to school in a subsequent year.

[THIS PAGE IS INTENTIONALLY BLANK]

Part 4:
Attendance Patterns: Portraits of Mobility

It has been noted that the traditional-age students in the three grade-cohort longitudinal studies increasingly attend more than one institution in the course of their undergraduate careers. But, as table 4.1 illustrates, the degree of change in this gross measure of multi-institutional behavior has been modest, and located principally in the general nonincidental student population, not in the sub-population of bachelor's degree completers. Roughly 60 percent of bachelor's degree recipients have attended more than one school as undergraduates since the 1970s.

Table 4.1. Percent of 1972, 1982, and 1992 12th graders who attended one, two, or more than two schools as undergraduates

	Class of 1972 (1972-84)	Class of 1982 (1982-93)	Class of 1992 (1992-2000)
All who earned more than 10 credits			
One	52.5 (0.55)	48.7 (0.85)	43.5 (1.06)
Two	32.5 (0.49)	32.7 (0.75)	35.1 (0.93)
More than two	15.0 (0.30)	18.6 (0.62)	21.5 (0.84)
All who earned bachelor's degrees			
One	42.8 (0.87)	42.0 (1.14)	40.6 (1.32)
Two	38.2 (0.80)	36.7 (1.06)	36.7 (1.20)
More than two	19.0 (0.60)	21.3 (0.96)	22.7 (1.14)

NOTES: (1) Columns may not sum to 100.0 percent because of rounding. (2) Standard errors are in parentheses. (3) Weighted Ns for all who earned more than 10 credits: Class of 1972 = 1.54M; Class of 1982 = 1.87M; Class of 1992 = 1.83M. For all students who earned bachelor's degrees: Class of 1972 = 734k; Class of 1982 = 825k; Class of 1992 = 921k.
SOURCES: National Longitudinal Study of the High School Class of 1972, High School and Beyond/Sophomore Cohort, NCES 2000-194); NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

The more important question may be *how* students attend more than one institution, and what combination of institutional types they attend. The Class of 1982 and the Class of 1992 files offer the opportunity for some basic observations about the changes beneath the surface of multi-institutional behavior. The comparative data are presented in table 4.2.

Table 4.2. Percent of 12th graders in the Class of 1982 and the Class of 1992 who attended different combinations of postsecondary institutional types

	Class of 1982 (1982-1993)				Class of 1992 (1992-2000)			
	All students		All who earned more than10 credits		All students		All who earned more than 10 credits	
Institutional type combinations								
4-year only	39.5	(0.91)	44.9	(0.98)	37.9	(1.01)	42.0	(1.12)
4-year, then 2-year	3.6	(0.28)	4.0	(0.32)	4.3	(0.40)	4.6	(0.43)
2-year, then 4-year	8.1	(0.42)	9.3	(0.49)	10.7	(0.60)	12.6	(0.69)
Alternating 2-year and 4-year	4.4	(0.30)	5.2	(0.35)	7.2	(0.65)	7.8	(0.59)
4-year plus incidental 2-year	-----[1]		-----[1]		6.0	(0.45)	7.3	(0.55)
4-year plus other sub-baccalaureate	2.6	(0.22)	2.5	(0.24)	0.9	(0.16)	1.0	(0.18)
2-year only	25.8	(0.74)	21.3	(0.74)	27.2	(0.96)	20.7	(0.96)
2-year plus other sub-baccalaureate	3.9	(0.32)	2.8	(0.27)	2.1	(0.24)	1.7	(0.18)
Other sub-baccalaureate only	10.3	(0.62)	8.2	(0.64)	2.9	(0.30)	1.5	(0.22)
4-year, 2-year and other sub-bacca-laureate	1.7	(0.22)	1.8	(0.26)	0.7	(0.14)	0.8	(0.17)

[1] The category of "4-year plus incidental 2-year" is new to the NELS:88/2000 accounting, and principally describes 4-year college students who occasionally attend community colleges during summer terms. In coding the transcripts of the High School Class of 1982, students who may have exhibited this pattern of attendance were included in the category "4-year only."

NOTES: (1) The universe of all students consists of 12th graders who became likely postsecondary participants. Class of 1982 Weighted N = 2.14M; Class of 1992 Weighted N = 2.09M. (2) The universe for students earning more than 10 credits in both cohorts consists of 12th graders for whom postsecondary transcripts were received. Class of 1982 Weighted N = 1.84M; Class of 1992 Weighted N = 1.83M. (3) Columns may not sum to 100.0 percent because of rounding. (4) Standard errors are in parentheses.

SOURCES: High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

The major inter-cohort changes among nonincidental students (those earning more than 10 credits) evident in table 4.2 involve increases in the percentages of students either moving from 2-year to 4-year institutions or alternating attendance between 2-year and 4-year institutions. The category of "2-year" institutions is dominated by community colleges but also includes 2-year branch campuses of 4-year schools and associate's degree-granting for-profit and not-for-profit schools.

Part of the decline in 4-year only attendance is an artifice of the creation of a new category of institutional combination for the Class of 1992, hence the decline is not significant. This category describes students who are based in 4-year colleges but who use 2-year colleges (principally community colleges) for incidental purposes (84 percent of this group earned 10 or fewer credits from 2-year schools), and usually during summer terms. In the Class of 1992 cohort, this group totals over 7 percent of nonincidental students. In the Class of 1982 cohort, these students were classified under the category of 4-year only.

The other major phenomenon observable in table 4.2 is that when the boundaries of the universe are narrowed from all students to those who earned more than 10 credits, the proportion of students attending "2-year colleges only" and "other sub-baccalaureate colleges only" falls, while the proportion of those attending "4-year colleges only" rises. The narrowing of boundaries eliminates the incidental students, who are less likely to attend more than one institution.

Transfer as a Subset of Multi-Institutional Attendance

Tables 4.3 and 4.4 take up the transfer phenomenon, a subset of multi-institutional attendance. Table 4.3 is exploratory in that it sets forth six attendance configurations involving both 2-year and 4-year institutions. For each configuration, table 4.3 indicates the percentage of students who earn a bachelor's degree and the mean number of credits they earn from three different types of institutions: 4-year, community colleges, and other 2-year (not-for-profit and for-profit associate's degree-granting schools).

The data show that students who start in a community college but who earn 10 or fewer credits from the community college before moving on to a 4-year institution have comparatively low (6.4 percent) bachelor's degree completion rates compared to students who start in a community college and who earn *more than* 10 credits from the community college (a mean of 56.1 credits) before moving on to a 4-year college (and earning more than 10 credits from 4-year colleges). These students enjoyed a much higher bachelor's degree completion rate (62.3 percent). This is the largest of the five transfer populations described.

What aspects of sustained community college experience yield a bachelor's degree when the student moves to a 4-year environment? What is it about early transfer from a community college to a 4-year school that diminishes a student's chances of earning a bachelor's degree? When these attendance patterns are combined with students' secondary school records and detailed college coursework, they might offer some intriguing hypotheses for further research (see, for example, Florida Council for Education Policy, Research, and Improvement 2002).

Table 4.3. Percent of 1992 12th graders who transferred between the 2-year and 4-year sectors of higher education at some time, 1992-2000, by type of transfer pattern and mean credits earned at different types of institutions

	Mean credits from 4-year (s.e.)	Mean credits from community college (s.e.)	Mean credits from other 2-year (s.e.)	**Percent of all in transfer patterns**
#1) Begins in community college, earns 10 or fewer community college credits, subsequently earns any credits from 4-year colleges	39.3 (6.46)	5.3 (0.62)	0.03 (0.33)	**2.9 (0.65)**
Percent earning bachelor's:	**6.4 (3.14)**			
#2) Begins in community college, earns more than 10 community college credits, subsequently earns more than 10 credits from 4-year colleges	71.8 (1.89)	56.1 (1.71)	2.2 (2.04)	**32.9 (1.69)**
Percent earning bachelor's:	**62.3 (3.41)**			
#3) Begins in community college, earns more than 10 community college credits, enrolls in a 4-year college, and earns 10 or fewer 4-year college credits	3.3 (0.43)	47.6 (3.01)	1.8 (0.82)	**6.2 (0.64)**
Percent earning bachelor's:	#			
#4) Begins a 2-year institution other than a community college and subsequently enrolls in a 4-year college, or starts in a community college and earns both community college and 4-year college credits but last date of attendance at community college falls after last date at 4-year college	32.6 (4.94)	22.0 (4.44)	24.8 (4.56)	**4.5 (0.64)**
Percent earning bachelor's:	**28.7 (7.26)**			
#5) Begins in a 4-year college and earns more than 10 credits in the 2-year sector	68.7 (3.03)	33.3 (1.19)	3.9 (0.94)	**25.2 (1.45)**
Percent earning bachelor's:	**38.2 (3.01)**			
#6) Begins in a 4-year college and subsequently earns 10 or fewer credits in the 2-year sector	112.4 (3.56)	3.8 (0.17)	#	**28.3 (1.53)**
Percent earning bachelor's:	**73.6 (2.88)**			

Rounds to zero.
NOTES: (1) The universe consists of all students who earned credits in both 2-year and 4-year colleges (Weighted N = 682k). (2) The column "Percent of all in transfer patterns" may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

As the comments on table 4.3 suggest, the five patterns of 2-year/4-year college attendance do not necessarily constitute "transfer." Since early analyses of the Class of 1972, "classic transfer" in the grade cohort transcript-based data sets has been defined as follows:

> The student who starts in a community college and earns more than 10 credits from the community college, then moves to a 4-year college and earns more than 10 credits from the 4-year college has transferred, even if the student returns to the community college at any time.

This is the definition used for the second of the transfer groups in table 4.3. Even if the threshold is changed from 10 to 12 or 15 credits (American Council on Education 1991; Jones 1991; Cohen and Brawer 1996), with this definition, those community college students who merely attended a 4-year college can be distinguished from those who truly transferred. With this definition, one can examine the universe of those students whose true first institution of attendance was a community college, derive a national "transfer rate," and follow changes in that rate and the ultimate degree attainments of students who transfer, over time. Table 4.4 does this across the three longitudinal studies cohorts.

The first universe of analysis in table 4.4 consists of all students who started out in community colleges, no matter how long they stayed, in terms of credits earned from community colleges. From the Class of 1972 to the Class of 1982, we note a rise in the proportion of those who become incidental students. Between the Class of 1982 and the Class of 1992, there was

- an increase in the proportion of these students who *attended* a 4-year college (from 29 to 37 percent);
- an increase in the proportion of these students who *transferred* to a 4-year college (from 21 to 27 percent); and
- no significant change in the combined associate's degree/bachelor's degree attainment rate (32 percent).

For the second universe of analysis, the first step in the classic transfer process is required: starting in a community college and earning more than 10 credits from the community college. For this group, there was

- an increase between the Class of 1982 and the Class of 1992 in the proportion of students who *attended* a 4-year college (from 35 to 44 percent; and from 32 to 44 percent from the Class of 1972 to the Class of 1992);
- no significant change in the combined associate's degree/bachelor's degree attainment rate (41-43 percent); and
- a *transfer* rate increasing from 28 percent (Class of 1972) and 27 percent (Class of 1982) to 36 percent for the Class of 1992. This figure is somewhat higher than other national estimates, but those other estimates include all students who start in community colleges, not just traditional-age 12th graders (see Cohen 1993).

It is the derivative of the second analysis, though, that is critical to the authority of the transfer indicator. That derivative is the bachelor's degree completion rate of traditional-age "classic transfer" students. For the classes of 1972 and 1982, both 11-12 year studies, the rate was 72 percent. For the Class of 1992, with an 8.5 year time frame, the rate was 62 percent. These rates compare favorably with those of the overall nonincidental postsecondary populations in all three cohorts (see table 2.1) and the population of students who earned any credits from 4-year colleges in the Class of 1972 and the Class of 1982 (see table 2.2). For the Class of 1992, there was no significant difference between the bachelor's degree attainment rate of community college transfer students and that of all students who earned any credits from 4-year colleges (see table 2.2).

Table 4.4. Transfer and degree completion rates of 12th graders in the classes of 1972, 1982, and 1992 who first entered postsecondary education at a community college

	Class of 1972 (1972-84)	Class of 1982 (1982-93)	Class of 1992 (1992-2000)
All			
Earned 10 or fewer credits from all institutions	18.8 (0.68)	22.5 (1.10)	21.1 (1.26)
Attended a 4-year college	28.5 (0.79)	28.9 (1.12)	36.5 (1.65)
Transferred to a 4-year college	21.4 (0.70)	20.8 (1.06)	27.1 (1.54)
Highest degree was:			
No degree	59.8 (0.93)	61.5 (1.20)	63.2 (1.59)
Certificate	5.0 (0.40)	6.4 (0.64)	5.5 (0.81)
Associate's	16.9 (0.65)	16.7 (0.88)	14.2 (1.08)
Bachelor's	18.2 (0.72)	15.4 (0.92)	17.1 (1.20)
Earned more than 10 credits from community colleges			
Attended a 4-year college	31.5 (0.89)	34.6 (1.40)	44.0 (1.95)
Highest degree was:			
No degree	50.8 (1.06)	50.4 (1.44)	53.6 (1.90)
Certificate	5.7 (0.48)	7.8 (0.80)	5.7 (0.96)
Associate's	22.8 (0.85)	22.3 (1.15)	18.2 (1.36)
Bachelor's	20.6 (0.79)	19.5 (1.20)	22.5 (1.53)
Transferred to a 4-year college	28.1 (0.37)	26.9 (1.32)	36.0 (1.88)
Highest degree was:			
No degree	15.3 (1.32)	12.3 (1.66)	23.7 (3.02)
Certificate	1.0 (0.29)	0.6 (0.23)	2.2 (0.18)
Associate's	12.0 (1.15)	14.8 (1.87)	11.8 (2.13)
Bachelor's	71.7 (1.61)	72.4 (2.38)	62.3 (3.40)

NOTES: (1) Universe consists of 12th graders who first entered postsecondary education at a community college. Weighted Ns: Class of 1972 = 686k; Class of 1982 = 872k; Class of 1992 = 814k. For those who earned more than 10 credits from community colleges: Class of 1972 = 522k, Class of 1982 = 618k, and Class of 1992 = 614k. (2) Standard errors are in parentheses.
SOURCES: National Center for Education Statistics: National Longitudinal Study of the High School Class of 1972, High School & Beyond/Sophomore Cohort, NCES 2000-194, and the NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

The Role of Special Mission Institutions in the Attendance Patterns of Minority Students

The gaps in aspects of access, participation, and degree completion between majority and minority populations noted in tables 2.1, 2.2, 2.4, 2.5, 2.6., and 2.7 are frequently cited in the literature. In response, one line of research aimed at ways of improving persistence and completion rates of minority students has focused on the roles of institutions whose special mission is to serve and nurture specific minority populations (see, e.g., Kim 2002; Allen 1992).

There are two large groups of institutions with such special missions:

- **Historically Black Colleges and Universities** (HBCUs), many of which have been serving African-Americans for over a century, were chartered with this mission (Hoffman, Snyder, and Sonnenberg 1992); and

- **Hispanic Serving Institutions** (HSIs), which are defined not by charter but instead by the proportion of their students who are Latino. These proportions grew in time and the designation of an HSI (requiring a minimum of 25 percent Latino enrollment) is a comparatively recent one (Stearns and Watanabe 2002).

In 89 of the 103 HBCUs, the proportion of students who were African-American in 1999 was over 75 percent (Snyder 2002, table 221, pp. 264-5), and the vast majority (89) of HBCUs are 4-year institutions or specialized graduate schools. The proportion of students who were Latino in the HSIs ranged from the threshold of 25 percent to 95 percent. Three-quarters of HSIs are community colleges, reflecting the historical attendance preferences of Hispanic populations (Snyder 2002, table 219, pp. 259-262; Adam 1999).

The NELS:88/2000 allows for an accounting of the use of these special mission institutions by their target populations. Tables 4.5 and 4.6 present selected aspects of that use and its outcomes.

Table 4.5 takes the full universe of African-American 12th graders in 1992 and divides their attendance pattern accounts with reference to enrollment in HBCUs. There are five patterns, two of which involve HBCUs. Slightly more than one out of five African-American students in the Class of 1992 started their postsecondary careers in an HBCU, and about 27 percent of African-American students attended an HBCU at some time. The reader will note that

- The bachelor's degree attainment rate of those African-American students who started in HBCUs was 49 percent, compared with a completion rate of 54 percent for African-Americans who attended 4-year institutions other than HBCUs. The difference is not statistically significant.

Table 4.5. Percentage distribution of 1992 12th grade African-American students' postsecondary attendance patterns with reference to Historically Black Colleges and Universities (HBCUs), by attendance pattern: 1992-2000

	Percent of African-American students who . . .				
		Began at other type but earned credits from an HBCU	Did not attend an HBCU and attendance:		
	Began at an HBCU		dominated[1] by 4-year colleges	confined to 2-year colleges	dominated[1] by other sub-baccalaureate
Distribution of All:	**23.0 (2.99)**	**3.8 (1.20)**	**34.9 (3.23)**	**34.3 (3.83)**	**4.0 (0.82)**
Highest Degree					
None	44.6 (6.86)	72.2 (10.4)	36.0 (5.16)	93.7 (1.99)	37.0 (9.41)
Certificate	5.1 (3.46)	0.0 ----	1.7 (0.85)	3.2 (1.47)	60.5 (9.62)
Associate's	1.9 (0.88)	8.8 (7.38)	8.3 (2.76)	3.1 (1.22)	2.5 (2.53)
Bachelor's	39.3 (6.32)	16.7 (8.44)	42.0 (5.08)		
Post-baccalaureate	6.2 (2.56)	0.0 -----	8.3 (2.05)		
Graduate	3.0 (1.24)	2.3 (2.40)	3.8 (1.12)		
Bachelor's or Above	48.5 (6.64)	19.0 (9.00)	54.0 (5.29)		
Of Bachelor's recipients, percent earning degree at:					
HBCU	91.3 (4.06)	84.2 (13.0)	. #		
Religious mission institution[2]	#	#	2.1 (0.94)		.
Other special mission institution[3]	#	#	7.8 (5.70)		
Other 4-year	8.7 (4.06)	15.8 (13.0)	90.0 (5.66)		
Entered directly from high school	93.9 (2.04)	57.6 (11.3)	83.7 (3.36)	61.0 (7.81)	49.3 (10.8)
Entered in same state as high school	59.5 (7.51)	75.0 (11.2)	71.8 (5.46)	88.0 (5.62)	87.8 (6.53)

Rounds to zero.
. Not applicable.
[1] "Dominated" means that 60 percent or more of all undergraduate credits earned by the student were earned at this type of institution.
[2] A "religious mission institution" is neither a specialized theological seminary (Carnegie Class 51) nor (necessarily) a denominationally affiliated institution (many of which have broad secular missions), rather it is a baccalaureate degree-granting college whose stated mission prominently includes religious education and is denominationally affiliated.
[3] Other special mission institutions include women's colleges, Hispanic serving institutions (HSIs), and tribal colleges.
NOTES: (1) The universe consists of all African-American 1992 12th graders who were postsecondary participants in the NELS:88/2000. Weighted N = 238k. (2) Columns for the five attendance patterns and for highest degree may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses. (4) The category of "Post-baccalaureate" includes both post-baccalaureate coursework and incomplete graduate degrees.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

- A slightly lower percentage of those who graduated from HBCUs continued to post-baccalaureate and graduate programs (19.0 percent, s.e.=3.86) than those who earned bachelor's degrees from other 4-year colleges (22.4 percent, s.e.= 4.06). But again, this difference (not shown directly in table 4.5) is not statistically significant.
- While not shown in table 4.5, among all African-American postsecondary participants, those who first entered 4-year colleges (HBCUs or others) were more likely to enter the postsecondary system directly from high school (91.2 percent; s.e. = 1.37) than those whose attendance was confined to 2-year colleges and other sub-baccalaureate institutions (56.5 percent; s.e. = 6.95).
- African-American students who began their college careers at an HBCU were more likely than other African-American college students to start higher education in a state other than the one in which they attended high school, a fact that testifies to the national stature of the HBCUs among African-Americans and their concentration in the South Atlantic, Southeast Central, and Southwest Central states.

Table 4.6 takes the full universe of Latino students and divides them by attendance pattern with reference to enrollment in HSIs (48 percent of Latino students in the Class of 1992 attended an HSI at some time, 64 percent of this group attended a 2-year HSI). Table 4.6 shows

- A 44 percent bachelor's degree completion rate among Latino students of the Class of 1992 who started at a 4-year HSI versus 58 percent completion rate for those who began their postsecondary careers at a non-HSI 4-year institution. This difference is not statistically significant.

- A combined certificate/associate's degree attainment rate of 19 percent for those who started out in a 2-year HSI and 14 percent for those who first entered other non-HSI 2-year colleges. Given the role of 2-year institutions in Latino postsecondary histories (these two groups account for half the Latino postsecondary students in the Class of 1992), the combined certificate/associate's degree attainment rate is an important indicator for this population.

- In terms of timing of postsecondary entry, Latino students who started out in 4-year colleges, whether HSIs or other, were more likely to do so directly following high school graduation than those who attended 2-year and other sub-baccalaureate institutions of any kind. The attendance pattern described as "other type but earned credits from an HSI" is difficult to analyze in this context because it includes students who embarked on their postsecondary education in all types of institutions—4-year, 2-year, and other sub-baccalaureate.

Table 4.6. Percentage distribution of 1992 12th grade Latino students' postsecondary attendance patterns with reference to Hispanic Serving Institutions (HSIs): 1992-2000

	Percent of Latino students who entered postsecondary education					
	at a 2-year HSI	at a 4-year HSI	at other type but earned credits from an HSI	at other 4-year	at other 2-year	at other sub-bacc
Distribution of all Latino students	**30.8 (3.36)**	**8.1 (1.47)**	**9.2 (2.25)**	**28.6 (3.44)**	**20.3 (2.34)**	**3.0 (1.25)**
Highest degree						
None	73.9 (4.91)	50.2 (7.38)	69.7 (4.48)	33.7 (4.40)	86.4 (3.37)	68.2 (14.1)
Certificate	9.8 (3.41)	3.5 (2.41)	2.8 (1.49)	0.2 (0.15)	3.5 (1.14)	31.8 (14.1)
Associate's	9.6 (4.30)	2.0 (1.13)	8.8 (3.91)	8.2 (2.25)	10.1 (3.04)	#
Bachelor's	3.7 (1.09)	32.0 (7.01)	14.5 (4.53)	35.6 (4.16)	#	#
Post-baccalaureate	2.0 (0.98)	8.5 (3.58)	3.2 (1.68)	16.4 (4.70)	#	#
Graduate	1.1 (0.77)	3.8 (1.80)	0.9 (0.72)	6.0 (1.28)	#	#
Bachelor's or above	6.8 (1.77)	44.3 (7.27)	18.7 (4.12)	57.9 (4.60)		
Of Bachelor's recipients, percent earning degree at an HSI	47.7 (11.8)	98.5 (1.59)	22.3 (12.3)	#		
Entered directly from high school	73.3 (4.90)	86.6 (3.84)	92.6 (3.57)	90.2 (2.85)	70.3 (6.06)	46.0 (20.2)
Heritage language study in college	7.4 (2.15)	30.0 (7.07)	29.3 (8.96)	16.2 (2.52)	1.3 (0.69)	#

Rounds to zero.

Not applicable.

NOTES: (1) The universe consists of all 1992 12th grade Latinos who became postsecondary participants. Weighted N = 193k. (2) Columns for the six attendance patterns and highest degree may not sum to 100.0 percent due to rounding. (3) Standard errors are in parentheses. (4) The category of "Post-Baccalaureate" includes post-baccalaureate coursework and incomplete graduate degrees.

SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

"Acceleration" and Its Effects

The last topic in this section on attendance patterns shifts the locus from place to time. It asks whether —and to what extent—students' use of credit-by-examination and postsecondary credits earned by coursework prior to high school graduation accelerated their progress toward degrees and, in fact, shortened time-to-degree. The data set from which the Class of 1992 is drawn (NELS:88/2000) flagged both classes of credits, then combined them. Separately and together, the academic effort represented in these credits is part of the general rubric of attendance patterns.

Credits earned by examination include not only credits granted for Advanced Placement test scores but also credits earned through the College Level Examination Program (CLEP) and institutional exams (the majority—in the Class of 1992 records—are in foreign languages).

Table 4.7 sets forth the percentage of students who earned acceleration credits in three ranges, and by three topics selected from precollegiate performance, initial entry, and ultimate attainment by age 26 or 27. The data indicate, first, that students in the highest quintile of high school academic coursework are more likely to earn credits by means other than post-matriculation course enrollment. The data also show that

- While there is no difference between highly selective and selective institutions in the number of credits earned outside the customary channels, there are measurable differences in the proportion of students earning acceleration credits between these two ranks of selectivity and all others. Since Advanced Placement coursework and test scores play a role in admission to highly selective and (most) selective institutions, the results are not surprising.

- A higher proportion of students who ultimately earned graduate degrees also earned acceleration credits than students who earned less than a graduate degree. One out of four students who ultimately earned a graduate degree notched 9 or more credits by examination or dual-enrollment, 10 times the proportion of students who earned no degree.

- For those who earned at least a bachelor's degree, the more credits earned by examination and in dual-enrollment status, the shorter the time-to-degree. For those with no acceleration credits, time-to-degree averaged 4.65 years elapsed calendar years; for those who earned 9 or more acceleration credits, time-to-degree averaged 4.25 years.

Taken together, these observations suggest that a multivariate analysis of the determinants of time-to-degree, such as that carried out on the state level by the Florida Postsecondary Education Planning Commission (Goodman, Latham, Copa, and Wright 2001) would be a profitable research inquiry (also see California Postsecondary Education Commission 1988; Texas Higher Education Coordinating Board 1996). They also encourage research that would split out the dual-enrollment portion of acceleration credits and determine whether the student was receiving both high school and college credit simultaneously or accumulating college credits outside the high school curriculum (Johnstone and del Genio 2001; Boswell 2001), and whether dual-enrollment prepares students for postsecondary coursework (Windham and Perkins 2001).

Table 4.7. Percent of 1992 12th graders who earned acceleration credits (dual-enrollment and credit-by-examination), by high school background, institutional selectivity, and degree attainment; and the impact of acceleration credits on time-to-degree for those who earned bachelor's degrees

	Number of acceleration credits		
	0	1-8	9 or more
All Students	**81.4 (0.75)**	**12.0 (0.60)**	**6.6 (0.50)**
By academic intensity of H.S. curriculum quintile			
Highest	60.8 (1.89)	22.1 (1.57)	17.1 (1.48)
2nd	80.2 (1.75)	12.0 (1.28)	7.8 (1.43)
3rd	87.0 (1.53)	10.7 (1.48)	2.3 (0.41)
4th	91.0 (1.24)	6.6 (1.03)	2.4 (0.73)
Lowest	86.5 (1.76)	10.7 (1.66)	2.8 (0.79)
By selectivity of the 1st institution attended			
Highly selective	49.1 (5.40)	21.2 (4.32)	29.7 (4.70)
Selective	58.0 (2.52)	22.8 (1.93)	19.2 (2.21)
Nonselective	83.3 (0.96)	11.4 (0.80)	5.3 (0.61)
Open door	87.3 (1.16)	9.7 (1.03)	3.0 (0.52)
Not ratable	93.9 (1.68)	3.3 (1.26)	2.8 (1.10)
By highest degree			
None	90.4 (0.95)	7.7 (0.80)	2.0 (0.53)
Certificate	89.9 (3.74)	8.1 (3.75)	2.1 (0.64)
Associate's	83.5 (2.58)	12.1 (2.33)	4.4 (1.39)
Bachelor's	74.6 (1.40)	15.6 (1.13)	9.8 (1.03)
Post-baccalaureate	71.5 (2.12)	18.6 (1.83)	9.9 (1.18)
Graduate	54.0 (3.24)	18.8 (2.49)	27.2 (3.34)
Mean time-to-degree[1] for bachelor's recipients	4.65 yrs (0.033) SD=1.09	4.40 yrs. (0.058) SD=0.99	4.25 yrs. (0.081) SD=1.08

[1]Time-to-degree is measured in elapsed calendar years from the true first date of attendance.

NOTES: (1) Universe consists of all 1992 12th graders who became postsecondary participants. Weighted N = 2.09M; for bachelor's degree recipients, Weighted N = 920k. (2) Rows may not sum to 100.0 percent due to rounding. (3) Standard errors are in parentheses. (4) Dual-enrollment means that the student took courses at postsecondary institutions while still enrolled in high school and received credit at both levels simultaneously. (5) Credit-by-examination is counted only when recognized on postsecondary transcripts.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Part 5:
Majors and Curriculum

The tables in this section of *Principal Indicators* set forth the following:

- changes in the distribution of majors[15] for those in the grade-cohort longitudinal studies who earned bachelor's and associate's degrees over the 28-year period covered by the three longitudinal studies cohorts;
- changes in the number of semester credits earned in selected curriculum clusters between the Class of 1982 (1982-1993) and the Class of 1992 (1992-2000); and
- an illustration of the distribution of curriculum cluster credits *within* major, at both the bachelor's and associate's degree levels, using the Class of 1992.

Taken together, these tables begin to reveal some ways of mapping the content of the delivered curriculum. The companion to this volume, *The Empirical Curriculum: Changes in Postsecondary Course-Taking, 1972-2000*, offers more detail on the topic.

Tables 5.1 and 5.2 display the proportion of bachelor's degree recipients in three grade-cohorts who earned their degrees in 12 broad curricular areas. The method of coding majors at a more detailed level changed between the Class of 1972 and Class of 1982 cohort transcript files, but the content of the aggregates remained constant.[16] The taxonomy of major codes covers fields of concentration at all levels of postsecondary education, from sub-baccalaureate vocational (e.g., cosmetology) to first-professional degrees in law and medicine. Bachelor's degrees are not awarded in all the fields covered by the coding system. In the history of the Class of 1982, bachelor's degrees were awarded in 96 fields, and in that of the Class of 1992, bachelor's degrees were awarded in 105 fields.

The 12 codes used in tables 5.1 and 5.2 aggregate the following fields in which bachelor's degrees were awarded across the three cohorts. Not all fields are listed, rather an illustrative sample.

---

[15] Change *of* major in the course of undergraduate education is another matter. For those in the Class of 1992 who earned bachelor's degrees, 40.5 percent (s.e.=1.20) changed major, and another 9.5 percent (s.e.=0.71) were either community college transfer students who earned an associate's degree in general studies and a bachelor's degree in a specific field or students who earned no degree with no identifiable major at a school they attended prior to the institution that awarded the bachelor's degree in a discrete field. These data are not in the tables, and are derived from both student responses to questions asked in the 2000 survey and transcript records.

[16] For the Class of 1972, 355 6-digit codes drawn from the 1985 version of the *Classification of Instructional Programs* (Washington, DC: National Center for Education Statistics) were used to code majors. Given the raw size of the cohort, many of the codes used yielded fewer than five cases, well below acceptable levels for the reliable computation of standard errors of estimates. For the Class of 1982, a 3-digit coding scheme was adopted with 111 codes. This scheme was carried over to the Class of 1992, where 18 new codes were added on the basis of volume of degree majors listed on received transcripts.

Figure 1. Major fields included in the 12 aggregate categories of major fields used in *Principal Indicators*

Aggregate Category	Sample of Major Fields
Business and Allied	Agricultural Business/Management, Accounting, Finance, Operations Research/Administrative Science, Business Administration, Human Resources Management/Labor Relations, Other Business (minor subfields)
Education	Early Childhood, Elementary, Secondary, Special Education, Physical Education, Other (minor subfields)
Engineering and Architecture	Architecture, Electrical/Communications Engineering, Chemical Engineering, Civil Engineering, Mechanical Engineering, Computer Engineering, Other Engineering (minor subfields), Engineering Technologies (all)
Physical Sciences	Chemistry, Geology, Physics, Other (e.g., Astronomy)
Mathematics and Computer Science	Mathematics/Statistics, Computer Science, Information Technology
Life and Agricultural Sciences	Agricultural/Animal/Plant Sciences, Biology (including all subfields), Biochemistry, Natural Resources/Conservation, Environmental Studies/Sciences
Health Sciences and Services	Clinical Health Sciences, Speech Pathology/Audiology, Medical/Veterinary Laboratory Technology, Physical Therapy, Occupational Therapy, Health/Physical Education/Recreation, Nutrition/Dietetics, Nursing
Humanities	English, Creative/Technical Writing, Foreign Languages, Philosophy, Religious Studies
Arts	Fine Arts/Art History, Music, Film Arts, Drama/Speech, Graphic Communications, Interior Design
Social Sciences	Anthropology/Archaeology, Psychology, Economics, History, Political Science, International Relations, Sociology, American Civilization, Area Studies, Ethnic Studies, Women's Studies

Figure 1. Major fields included in the 12 aggregate categories of major fields used in *Principal Indicators*—Continued

Aggregate Category	Sample of Major Fields
Applied Social Sciences	Communications, Administration of Justice, Child, Family & Community Studies, Social Work, Leisure Studies/ Recreation, Public Administration, Human/Community Services
Other	Communications Technologies, Air Transport, General Studies, Theology, Bible Studies

SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

While other configurations could be constructed for these aggregates, the assignment of the major field codes was driven by volume of majors, reviewed by panels of registrars and institutional research officers in both 1995 and 2001 and judged to be reasonable representations.

For tables 5.1 and 5.2, the histories for all three cohorts are truncated at 8.5 years after high school graduation (the postsecondary life span of the Class of 1992) to insure comparability in the distribution of students by gender and race/ethnicity across the 12 aggregate major fields. The following general patterns in table 5.1 under the columns headed "All" can be observed:

- the proportion of all students earning bachelor's degrees in business and allied fields rose from the 1970s to the 1980s, then fell back in the 1990s;
- the categories of mathematics and computer science, dominated by computer science and other computer-related fields, followed the same pattern as did business;
- the proportion of all students earning bachelor's degrees in education fell from the 1970s through the 1980s, but rose modestly in the 1990s; and
- a decline in the proportion of students earning degrees in the physical sciences between the Class of 1972 and the Class of 1992.

Considering differences in these trends by gender, one can observe:

- a rise in the proportion of women majoring in the social sciences and life sciences between the Class of 1972 and the Class of 1992; and
- a notable increase in the proportion of men earning degrees in health sciences and services between the 1980s and 1990s.

Changes in the distribution of majors among bachelor's degree recipients, by race/ethnicity, displayed in table 5.2, include the following notable items:

- Among African-American students, the proportion receiving degrees in Engineering in the Class of 1992 was six times the proportion in the Class of 1972. On the surface, the 12.6 percent figure appears to be higher than those for students from all other race/ethnicity groups, but these differences are not statistically significant.

- Among African-American students, the proportion earning bachelor's degrees in the physical sciences in the Class of 1992 appears to be triple that for the same group in the Class of 1982, and appears greater than the proportions for all other race/ethnicity groups, but none of these differences are statistically significant.

Since the sum of a distribution by major field for any group of degree recipients adds to 100.0 percent, significantly greater shares in areas such as engineering and physical sciences mean lesser shares in other fields. For African-American college graduates over the 28 years of the three cohort studies, this phenomenon (declining intra-group share) can be observed in the humanities and education, and, between the 1980s and 1990s, in applied social sciences and computer science/mathematics. Researchers should be encouraged by these data to investigate the ways in which some fields have been successful in recruiting and retaining minority students, and to examine the characteristics and histories of the African-American students in the Class of 1992 who completed degrees in engineering and the physical sciences against students from (1) other race/ethnicity groups and (2) earlier cohorts of African-American bachelor's degree recipients.

Other trends worth noting in consideration of the change in the distribution of majors by race/ethnicity include:

- the rebound between the 1980s and 1990s in the proportion of bachelor's degree recipients receiving degrees in education was led by White students; and
- between the 1980s and 1990s, a drop in the proportion of Asian-American students earning bachelor's degrees in engineering.

Table 5.3 digs below the surface of the 12 aggregate major categories, and, confining its analysis to the Class of 1992, asks for the 20 majors (out of 129 discrete major codes) that accounted for the highest proportion of bachelor's degree recipients in that cohort. The basic distribution is set forth in table 5.3, where the analytic rubrics are gender and selectivity of the institution awarding the degree.

The distribution by gender reveals that (1) the most "popular" major field, psychology, is dominated by women, (2) among the various business fields, men and women come closest to parity in accounting and marketing, and (3) historically gender-segmented fields (for example, engineering, elementary education, nursing) remain gender-segmented . The distributions by selectivity of the institution awarding the bachelor's degree are more dramatic:

- Engineering majors account for nearly one out of four degrees awarded by highly selective institutions, a far higher percentage (and statistically significant) than for institutions of lesser selectivity.
- Evidently, very few highly selective institutions offer degrees in elementary education, accounting, business administration, marketing, criminal justice, nursing, and health/physical education/recreation.

Table 5.1. Distribution of majors of 12th graders in the high school classes of 1972, 1982, and 1992 who earned the bachelor's degree within 8.5 years of the modal cohort high school graduation date, by gender

	All			Men			Women		
	1972	1982	1992	1972	1982	1992	1972	1982	1992
Business and Allied Fields	17.2 (0.63)	25.3 (1.08)	17.0 (0.86)	24.4 (0.95)	28.3 (1.55)	21.6 (1.44)	9.1 (0.69)	22.5 (1.35)	13.4 (1.04)
Education	16.3 (0.63)	6.4 (0.58)	8.7 (0.59)	8.1 (0.61)	2.1 (0.47)	3.7 (0.51)	25.4 (1.07)	10.4 (0.95)	12.5 (0.94)
Engineering and Architecture	6.0 (0.39)	9.0 (0.69)	7.9 (0.76)	10.5 (0.68)	16.9 (1.29)	13.9 (1.44)	0.8 (0.20)	1.9 (0.42)	3.4 (0.72)
Physical sciences	3.0 (0.30)	2.4 (0.36)	1.6 (0.31)	4.3 (0.48)	3.9 (0.67)	2.1 (0.36)	1.5 (0.31)	1.1 (0.32)	1.2 (0.47)
Mathematics and Computer science	1.8 (0.24)	6.2 (0.61)	3.9 (0.56)	2.2 (0.38)	7.3 (0.98)	5.2 (0.73)	1.3 (0.25)	5.1 (0.72)	3.0 (0.83)
Life and Agricultural sciences	8.5 (0.44)	6.1 (0.58)	8.3 (0.57)	10.9 (0.69)	6.1 (0.79)	9.0 (0.91)	5.8 (0.54)	6.1 (0.80)	7.7 (0.71)
Health sciences and services	7.4 (0.44)	6.3 (0.55)	7.6 (0.58)	2.8 (0.36)	1.8 (0.43)	4.7 (0.73)	12.6 (0.81)	10.4 (0.99)	9.8 (0.85)
Humanities	6.1 (0.39)	6.2 (0.53)	7.0 (0.74)	4.3 (0.43)	5.0 (0.71)	5.2 (0.91)	8.2 (0.66)	7.4 (0.80)	8.3 (1.02)
Arts	4.8 (0.35)	4.6 (0.48)	5.5 (0.56)	3.0 (0.35)	3.9 (0.63)	4.6 (0.66)	6.9 (0.62)	5.2 (0.74)	6.3 (0.84)
Social sciences	17.9 (0.65)	16.0 (0.98)	19.4 (1.01)	19.7 (0.96)	14.9 (1.32)	18.6 (1.68)	15.9 (0.82)	17.0 (1.31)	19.9 (1.33)
Applied social sciences	8.9 (0.47)	10.4 (0.67)	11.1 (0.76)	7.2 (0.60)	8.1 (0.93)	9.3 (1.06)	10.8 (0.74)	12.4 (0.97)	12.5 (1.06)
Other	2.1 (0.24)	1.1 (0.22)	2.0 (0.36)	2.5 (0.38)	1.7 (0.40)	1.0 (0.38)	1.7 (0.30)	0.5 (0.19)	2.0 (0.56)
Total:	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

NOTES: (1) Columns may not sum to 100.0 percent due to rounding. (2) Standard errors are in parentheses. (3) Weighted Ns for Class of 1972 = 692k; Class of 1982 = 767k; Class of 1992 = 920k.
SOURCES: National Longitudinal Study of the High School Class of 1972, High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 5.2. Distribution of majors of 12th graders in the high school classes of 1972, 1982, and 1992 who earned the bachelor's degree within 8.5 years of the modal cohort high school graduation date, by race/ethnicity

	White			African-American			Latino			Asian		
	1972	1982	1992	1972	1982	1992	1972	1982	1992	1972	1982	1992
Business and Allied Fields	17.3 (0.68)	25.6 (1.15)	17.4 (0.99)	16.5 (2.27)	26.2 (4.23)	15.5 (3.02)	11.7 (3.85)	19.8 (2.94)	14.7 (3.02)	21.8 (4.92)	17.3 (3.64)	14.9 (2.62)
Education	16.2 (0.66)	6.7 (0.63)	9.4 (0.67)	21.9 (2.21)	5.9 (2.04)	6.1 (1.68)	15.0 (4.26)	6.4 (1.94)	8.5 (2.62)	10.1 (3.56)	0.8 (0.50)	1.9 (0.69)
Engineering and Architecture	6.2 (0.41)	8.9 (0.76)	7.4 (0.77)	1.7 (0.60)	6.1 (1.92)	12.6 (5.18)	4.4 (1.97)	10.7 (2.55)	7.5 (2.47)	10.1 (3.07)	20.2 (3.25)	10.8 (2.26)
Physical sciences	3.0 (0.31)	2.4 (0.39)	1.1 (0.18)	1.9 (0.73)	1.3 (1.01)	6.6 (3.36)	1.4 (1.37)	1.2 (0.75)	1.6 (1.27)	3.1 (1.82)	1.4 (0.98)	2.3 (0.84)
Mathematics and Computer science	1.7 (0.25)	6.2 (0.67)	3.7 (0.62)	1.8 (0.68)	7.2 (2.16)	4.0 (1.26)	# #	5.7 (1.97)	7.0 (4.21)	9.0 (3.43)	6.9 (1.84)	4.7 (1.15)
Life and Agri-cultural sci	8.7 (0.48)	5.7 (0.63)	7.9 (0.58)	5.9 (1.48)	6.9 (2.22)	4.7 (1.45)	8.1 (2.83)	5.4 (2.36)	7.8 (1.78)	10.6 (3.20)	19.7 (4.46)	18.4 (4.23)
Health sciences and services	7.5 (0.47)	6.5 (0.60)	7.7 (0.58)	6.9 (1.31)	6.0 (2.32)	7.3 (3.63)	8.6 (4.73)	3.9 (1.51)	3.8 (1.29)	7.0 (2.17)	3.1 (1.40)	7.7 (2.15)
Humanities	6.3 (0.41)	6.7 (0.59)	7.8 (0.59)	6.3 (1.52)	2.0 (0.90)	2.3 (0.88)	8.1 (2.78)	4.7 (1.52)	6.0 (1.08)	3.3 (2.28)	3.8 (1.57)	2.6 (0.67)
Arts	5.0 (0.37)	4.6 (0.52)	5.2 (0.44)	3.0 (0.96)	3.5 (1.40)	9.5 (4.76)	5.4 (2.68)	5.4 (2.53)	4.3 (2.38)	3.7 (1.65)	3.3 (1.61)	6.4 (1.83)
Social sciences	17.3 (0.70)	15.8 (1.06)	19.4 (1.08)	23.9 (2.40)	17.1 (3.13)	19.4 (5.42)	21.3 (4.45)	17.3 (3.95)	17.4 (2.71)	17.0 (4.20)	17.1 (3.32)	20.8 (3.81)
Applied social sciences	8.8 (0.49)	10.0 (0.70)	11.1 (0.79)	9.5 (1.69)	15.3 (3.30)	11.9 (3.89)	14.9 (4.15)	16.2 (5.40)	12.2 (2.33)	3.7 (1.85)	6.3 (1.73)	9.3 (3.91)
Other	2.3 (0.27)	1.0 (0.22)	1.8 (0.38)	0.6 (0.36)	2.3 (1.23)	0.1 (0.06)	1.1 (1.11)	3.4 (2.27)	9.8 (4.95)	0.6 (0.61)	0.2 (0.17)	0.2 (0.14)
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Rounds to zero.

NOTES: (1) Columns may not sum to 100.0 percent because of rounding. (2) Standard errors are in parentheses. (3) Weighted Ns for Class of 1972 = 692k; Class of 1982 = 767k; Class of 1992 = 920k.

SOURCES: National Longitudinal Study of the High School Class of 1972; High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 5.3. Percent of 1992 12th graders who received bachelor's degrees in the 20 fields with the highest proportion of majors, by gender and selectivity of institution awarding the bachelor's degree

	By gender			By selectivity of institution awarding the bachelor's degree		
	All	Men	Women	Highly selective	Selective	Nonselective
Psychology	7.6 (0.67)	4.9 (0.78)	9.7 (0.98)	9.1 (2.48)	7.0 (1.01)	7.9 (0.90)
Engineering (All)	6.1 (0.65)	11.2 (1.38)	2.2 (0.50)	24.1 (5.72)	9.6 (1.48)	2.7 (0.33)
Elementary Education	5.4 (0.48)	1.9 (0.37)	8.1 (0.78)	#	2.1 (0.39)	7.3 (0.68)
Biology	5.6 (0.43)	5.2 (0.58)	5.9 (0.66)	9.8 (3.23)	5.7 (0.82)	5.2 (0.47)
Accounting	5.0 (0.60)	5.1 (1.07)	5.0 (0.70)	#	6.6 (1.72)	5.0 (0.60)
Business Administration	4.5 (0.50)	6.4 (1.00)	3.1 (0.41)	0.6 (0.45)	2.5 (1.03)	5.8 (0.64)
Communications	3.9 (0.52)	3.3 (0.73)	4.5 (0.73)	1.1 (0.58)	2.9 (0.75)	4.7 (0.72)
English	3.8 (0.44)	3.3 (0.79)	4.1 (0.49)	5.7 (2.04)	2.7 (0.53)	4.1 (0.59)
Marketing	2.6 (0.37)	2.8 (0.49)	2.5 (0.53)	0.4 (0.42)	2.7 (1.07)	2.9 (0.37)
Sociology	2.3 (0.48)	1.7 (0.64)	2.8 (0.68)	1.0 (0.46)	1.3 (0.38)	3.0 (0.70)
Political Science	2.3 (0.29)	2.5 (0.44)	2.1 (0.38)	3.2 (1.23)	3.7 (0.70)	1.6 (0.28)
Computer and information sciences	2.5 (0.49)	3.3 (0.46)	1.9 (0.79)	1.5 (0.74)	1.5 (0.38)	3.1 (0.73)
Criminal Justice	2.2 (0.34)	3.1 (0.68)	1.5 (0.30)	#	0.4 (0.18)	3.1 (0.50)
Finance	2.1 (0.26)	3.3 (0.50)	1.1 (0.23)	1.9 (1.00)	1.6 (0.46)	2.3 (0.32)
History	2.0 (0.31)	2.8 (0.65)	1.3 (0.26)	3.3 (1.16)	3.1 (1.04)	1.4 (0.23)
Nursing	1.8 (0.26)	0.7 (0.33)	2.6 (0.37)	0.2 (0.16)	0.7 (0.25)	2.2 (0.36)
Economics	1.8 (0.31)	3.0 (0.67)	0.8 (0.19)	7.0 (3.12)	2.9 (0.58)	0.7 (0.22)
Fine Arts	1.7 (0.23)	1.2 (0.31)	2.0 (0.33)	1.5 (0.87)	1.0 (0.30)	1.8 (0.29)
Health/Physical Education/ Recreation (HPER) (0.26)	1.6 (0.53)	2.3 (0.24)	1.1	0.1 (0.09)	1.3 (0.43)	1.9 (0.36)
Mathematics/Statistics	1.4 (0.29)	1.9 (0.59)	1.0 (0.25)	1.1 (0.64)	2.0 (0.90)	1.2 (0.25)
Other majors	33.8 (1.10)	29.8 (1.51)	36.7 (1.59)	28.3 (5.82)	38.6 (2.60)	32.0 (1.23)
Percent of all in column category		**43.6** (1.13)	**56.4** (1.13)	**6.9 (0.76)**	**25.4 (1.20)**	**66.6 (1.39)**

Rounds to zero.
NOTES: (1) Universe consists of all bachelor's degree recipients (Weighted N = 920k). (2) 1.1 percent of the institutions awarding bachelor's degrees are not rated for selectivity. (3) Communications does not include journalism or Radio/TV/Film, both of which are separate categories of major. (4) Columns may not sum to 100.0 percent because of rounding. (5) Standard errors are in parentheses. **SOURCE:** NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

The bachelor's degree is not the only undergraduate degree awarded in U.S. higher education. Over one-half million associate's degrees have been awarded every year since 1991 (Snyder 2002, table 252, p. 298). If the data for the Class of 1992 are an accurate reflection, 79 percent of these associate's degrees were awarded by community colleges (not in tables). For the Class of 1982, the proportion of associate's degrees awarded by community colleges was roughly the same at 83 percent.

Table 5.4 isolates only those associate's degrees awarded by community colleges to students in the three longitudinal studies, allows the studies to run their course (as opposed to truncating them at a common point, as was the case in the presentation of bachelor's degree majors) in order to account for those who earn associate's degrees after the bachelor's, and uses nine aggregates of major fields to plot change in the content of the community college associate's degree over time. Given the fact that the ratio of associate's degrees awarded by community colleges to total bachelor's degrees awarded is less than .5 (Snyder 2002, tables 265 and 268), gender is the only demographic independent variable that is likely to produce statistically defensible analyses.

In table 5.4, the story of business and allied majors that was told in the case of bachelor's degrees is repeated at the associate's level: between the 1970s and 1980s, the proportion of all degrees awarded rose, then dropped in the 1990s—and this trend held for both men and women. Second, continued gender-segmentation across all three cohorts is observable in business support occupations, engineering/technical occupations programs, and health sciences & services.

But the most significant change—and it occurs between the 1980s and 1990s—is an increase of over 40 percent in the proportion of community college awarded associate's degrees in General Studies. This degree is the classic A.A. transfer degree, and the proportion of these degrees in the comparatively short (8.5 year) history of the NELS:88/2000 indicates the potential for a long-term transfer rate higher than the 26 percent reported in table 4.4. And in one of the few stories of its type in these histories, both men and women show similar increases in this key momentum indicator.

The category of "Other" in table 5.4 accounts for one out of five associate's degrees awarded to men in the Class of 1992. Associate's degrees in Criminal Justice constituted nearly half of the degrees in this category (followed, in percentages, by paralegal and culinary arts programs). At the associate's degree level, Criminal Justice is a police academy degree, perhaps explaining some of the gender distribution.

Table 5.4. Distribution of associate's degree majors of 12th graders in 1972 (through 1984), 1982 (through1993), and 1992 (through 2000) who earned associate's degrees from community colleges

	All			Men			Women		
	1972	1982	1992	1972	1982	1992	1972	1982	1992
Business and allied fields	12.1 (1.07)	20.0 (1.80)	8.2 (1.14)	14.4 (1.64)	21.3 (2.93)	7.5 (1.78)	9.7 (1.28)	19.2 (2.18)	8.8 (1.53)
Business support	6.2 (0.71)	9.2 (1.26)	8.2 (2.28)	1.0 (0.39)	0.9 (0.62)	1.5 (0.92)	11.3 (1.34)	14.8 (2.01)	13.3 (3.74)
Computer related	2.3 (0.45)	4.4 (0.96)	1.9 (0.48)	3.5 (0.79)	5.5 (1.46)	2.4 (0.82)	1.1 (0.43)	3.7 (1.28)	1.5 (0.56)
Engineering and other technology	7.1 (0.76)	7.7 (1.36)	7.1 (1.77)	13.1 (1.41)	16.2 (2.94)	13.3 (3.70)	1.0 (0.39)	1.9 (0.76)	2.3 (1.01)
Health sciences and services	13.2 (1.05)	10.8 (1.42)	10.7 (1.39)	3.2 (0.77)	3.2 (1.08)	2.0 (0.69)	23.1 (1.85)	15.9 (2.21)	17.3 (2.32)
Science and mathematics	2.1 (0.43)	4.4 (0.77)	3.1 (0.67)	3.0 (0.74)	6.5 (1.63)	4.8 (1.38)	1.2 (0.46)	3.0 (0.82)	1.9 (0.59)
Arts/applied arts	3.8 (0.55)	4.4 (0.87)	2.9 (0.64)	3.4 (0.77)	4.5 (1.37)	3.3 (1.08)	4.3 (0.79)	4.3 (1.11)	2.7 (0.73)
General studies	39.4 (1.68)	29.8 (1.99)	42.5 (2.98)	41.5 (2.26)	31.3 (3.20)	44.1 (4.50)	37.3 (2.06)	28.7 (2.59)	41.4 (3.60)
Other	13.9 (1.15)	9.4 (1.42)	15.3 (2.15)	16.8 (1.66)	10.4 (2.21)	21.1 (3.90)	11.0 (1.49)	8.6 (1.85)	10.9 (2.23)

NOTES: (1) Columns may not sum to 100.0 percent because of rounding. (2) Standard errors are in parentheses. (3) Weighted Ns: Class of 1972 = 195k; Class of 1982 = 232k; Class of 1992 = 206k.
SOURCES: National Longitudinal Study of the High School Class of 1972; High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Moving Into Curriculum

There are many ways to represent the curricular content of students' postsecondary experiences. The companion document to this presentation (forthcoming), *The Empirical Curriculum*, provides detail across 1,178 course categories and 109 aggregate groupings, and by gender, race/ethnicity, and features of students' attendance.

For *Principal Indicators*, nine curriculum clusters that are common to both the High School & Beyond/ Sophomore cohort (Class of 1982) and the NELS:88/2000 (Class of 1992) are selected to illustrate how material such as this can be used by local academic administrators to determine whether institutional goals for students' basic exposure and depth of study might be measured using unobtrusive transcript data.

In the files for both longitudinal studies (and for the NLS-72, as well), variables were created for many curriculum clusters, but the definitions for a few of them were altered slightly based on the nature of student records and thus are not wholly comparable. For example, all three data sets contain three clusters for foreign languages:

FLANCRD1	All credits in introductory and intermediate level foreign language courses
FLANCRD2	All credits in advanced foreign language courses, including literature
FLANCRD3	All credits in all foreign language courses

Only FLANCRD3 is truly comparable across all three cohort studies.

For another type of example, the external faculty review panel for the NELS:88/2000 that covered engineering, engineering technologies, and computer science recommended moving all computer applications courses either into the disciplines in which they were offered in applied contexts (for example, agriculture, graphics and design) or into a new "chapter" of the taxonomy, with new codes. Many of these courses had previously been coded under computer science. While the course cluster for all "computer-related" credits remained the same, that for computer science, narrowly construed, changed significantly, and one cannot compare credit production in these categories with those of previous longitudinal studies.

Table 5.5 compares credit production in nine curriculum clusters across two cohorts, the Class of 1982 and the Class of 1992, and for two groups of students:

- All students who earned at least 1 year's worth of semester-equivalent credits (that is, more than 30), and
- All bachelor's degree recipients.

The threshold for the first group was set at more than 30 so that the resulting universe of credits (and the students who earned them) is substantial enough to yield informative analysis. The clusters are *not* mutually exclusive. For example, some foreign languages are included in the cluster for non-Western cultures and societies as well as in the cluster for all foreign languages.

Table 5.5. Credits earned in selected postsecondary curriculum clusters by 1982 and 1992 12th graders who earned at least 30 undergraduate credits

	High School Class of 1982 1982-1993		High School Class of 1992 1992-2000	
	All students who earned >30 credits	Students who earned bachelor's degree	All students who earned >30 credits	Students who earned bachelor's degree
Credits earned in:				
"Level 1" core laboratory science[1]				
None	47.6 (0.88)	34.2 (1.09)	42.8 (1.01)	31.6 (1.14)
1-4	20.6 (0.71)	22.2 (1.00)	21.5 (0.78)	23.5 (1.03)
5-8	14.7 (0.62)	17.2 (0.90)	14.9 (0.79)	17.1 (1.05)
9-12	4.9 (0.37)	7.0 (0.61)	6.0 (0.38)	6.8 (0.53)
More than 12	12.2 (0.58)	19.3 (0.96)	14.9 (0.61)	21.0 (0.91)
All foreign languages				
None	68.9 (0.91)	56.1 (1.27)	61.3 (0.96)	49.9 (1.23)
1-6	14.0 (0.60)	17.5 (0.86)	16.7 (0.65)	18.8 (1.80)
7-12	10.2 (0.53)	14.9 (0.81)	13.4 (0.65)	18.0 (0.94)
13-19	4.2 (0.39)	7.0 (0.68)	5.1 (0.41)	7.9 (0.65)
More than 19	2.7 (0.30)	4.6 (0.53)	3.4 (0.36)	5.4 (0.60)
Calculus and advanced math[2]				
None	73.6 (0.77)	58.5 (1.13)	73.2 (0.83)	61.2 (1.15)
1-4	11.3 (0.57)	16.6 (0.89)	12.9 (0.56)	18.5 (0.84)
5-9	7.4 (0.44)	11.9 (0.75)	6.2 (0.39)	8.9 (0.60)
More than 9	7.7 (0.44)	13.0 (0.76)	7.7 (0.53)	11.4 (0.82)

See notes at end of table.

Table 5.5. Credits earned in selected postsecondary curriculum clusters by 1982 and 1992 12th graders who earned at least 30 undergraduate credits–Continued

	High School Class of 1982 1982-1993		High School Class of 1992 1992-2000	
	All students who earned >30 credits	Students who earned bachelor's degrees	All students who earned >30 credits	Students who earned bachelor's degrees
Credits earned in:				
Non-Western cultures and societies[3]				
None	88.1 (0.60)	81.9 (0.90)	81.2 (0.74)	73.2 (1.09)
1-4	8.7 (0.52)	12.8 (0.81)	12.2 (0.65)	17.1 (0.98)
More than 4	3.1 (0.40)	5.2 (0.53)	6.6 (0.51)	9.7 (0.89)
All statistics[4]				
None	63.9 (0.86)	45.2 (1.18)	60.2 (0.96)	43.9 (1.23)
1-4	25.1 (0.78)	36.5 (1.15)	30.6 (0.90)	42.1 (1.19)
More than 4	11.0 (0.74)	18.3 (1.28)	9.2 (0.68)	14.0 (0.95)
Fine and performing arts				
None	54.6 (0.96)	42.1 (1.16)	45.9 (0.95)	35.1 (1.11)
1-4	23.4 (0.76)	27.9 (1.04)	28.9 (0.86)	32.1 (1.09)
5-9	11.8 (0.61)	16.5 (0.89)	13.8 (0.60)	18.4 (0.88)
10-15	4.1 (0.36)	5.2 (0.55)	3.9 (0.33)	4.7 (0.95)
More than 15	6.0 (0.43)	8.4 (0.64)	7.6 (0.48)	9.5 (0.74)

See notes at end of table.

Table 5.5. Credits earned in selected postsecondary curriculum clusters by 1982 and 1992 12th graders who earned at least 30 undergraduate credits—Continued

	High School Class of 1982 1982-1993		High School Class of 1992 1992-2000	
	All students who earned >30 credits	Students who earned bachelor's degrees	All students who earned >30 credits	Students who earned bachelor's degrees
Credits earned in:				
History				
None	34.2 (0.93)	17.7 (0.92)	27.2 (0.81)	14.0 (0.73)
1-4	23.7 (0.76)	25.0 (0.95)	24.8 (0.88)	25.6 (1.14)
5-9	29.3 (0.82)	37.3 (1.20)	32.9 (0.87)	38.6 (1.17)
More than 9	12.9 (0.72)	19.9 (1.09)	15.0 (0.63)	21.8 (0.96)
Computer related[5]				
None	42.5 (0.95)	33.6 (1.15)	38.2 (0.92)	36.0 (1.10)
1-4	31.0 (0.83)	35.1 (1.09)	37.0 (0.89)	40.0 (1.11)
5-9	14.6 (0.63)	17.7 (0.86)	15.5 (0.65)	15.8 (0.86)
More than 9	12.0 (0.62)	13.6 (0.80)	9.3 (0.56)	8.2 (0.67)
Writing beyond freshman composition[6]				
None	75.5 (0.86)	67.5 (1.16)	72.6 (0.83)	65.2 (1.10)
1-4	18.9 (0.77)	24.0 (1.05)	20.6 (0.78)	25.3 (1.02)
More than 4	5.6 (0.41)	8.5 (0.64)	6.8 (0.40)	9.6 (0.58)

[1] "Level 1" Core Laboratory Science includes general chemistry (and, if in a sequence, analytic chemistry), general biology (or introductory zoology and introductory botany), general physics, and general physics with calculus.
[2] Calculus, linear algebra, differential equations, abstract algebra, topology, matrix theory, etc., and advanced statistics (e.g., stochastic models, path analysis).
[3]The cluster includes course codes for Area Studies (African, Asian, East Asian, Latin American, Middle Eastern, Pacific, South Asian, Southeast Asian, Carribean), Islamic Studies, Non-Western Philosophy/Religions/Literature-in-Translation/Art/Music, all Non-Western languages, African/Asian/Latin American/Middle Eastern history, Third World Economics, Third World Cultures (Anthropology), Geography of Africa/Asia/Pacific/Latin America/Carribean, and Non-Western Governments and Politics.
[4] In addition to statistics taught under mathematics, the cluster includes course category codes for business statistics, economic statistics, biostatistics, education statistics, engineering statistics, and general social science statistics.
[5]In addition to all computer science codes, the cluster includes computer applications courses, basic computer operations training, computer engineering, computer engineering technology, computer repair, data processing, and business information system courses.
[6]Includes creative writing, technical writing, journalism, and writing for the media.
NOTES: (1) Universe consists of all 12th graders who subsequently entered postsecondary education and whose postsecondary records were complete.. Weighted Ns for the four universes used in these tables are: HS&B/Sophomore Cohort: more than 30 Credits = 1.553M; Bachelor's = 874k. NELS:88/2000: more than 30 Credits = 1.620M; Bachelor's = 937k. (2) Standard errors are in parentheses.
SOURCES: High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Observations on some of the comparisons evident in table 5.5, and the questions they raise

- **Foreign Languages**. A modest increase in the overall participation rate of all students who earned more than 30 credits (from 31 to 39 percent), and among bachelor's degree recipients (from 44 to 50 percent). Credits earned in foreign languages, though, are not necessarily a proxy for fluency.

- **Writing Beyond Freshman Composition**. A slight increase in the proportion of students earning more than 30 credits who complete discrete courses in writing that require freshman composition (or a waiver by examination) as a prerequisite. This datum might be investigated as part of a potential indicator of written communication skills.

- **Non-Western Cultures and Societies**. A modest increase in the overall participation rate of both students who earned more than 30 credits (from 12 to 18 percent) and bachelor's degree recipients (from 19 to 27 percent)in a cluster that can serve as one indicator of the degree to which students are being exposed to global perspectives.

- **"Level 1" Core Laboratory Science**. Negligible change in the distribution of credits earned between the 1980s and 1990s cohorts.

- **Calculus and Advanced Math**. No meaningful change in the distribution of credits across the two cohorts.

The last two observations acquire greater meaning in the context of students' secondary school records. For example, assume that one objective of an institution of higher education is to ensure that as many of its students as possible reach at least the level of precalculus in mathematics. The measurement of that goal would take high school mathematics course-taking into account. If more students reached the goal prior to college entry, then one may be less concerned if there were no change in the credit distribution at the college level. Table 5.6 demonstrates that, in fact, this is the case for the Class of 1992, where the distribution of bachelor's degree recipients' highest level of mathematics in high school shows a notable increase from the previous cohort (Class of 1982) at the levels of precalculus and calculus, and little change in the proportions of students earning credits in calculus at the college level. The message of these apparently discordant indicators warrants further investigation in terms of the potential for increasing the proportion of students who major in science, technology, engineering, and mathematics (STEM) fields.

The curricular pathways from secondary school into and through postsecondary education are both complex and conditioned by factors that have not been brought into play here. Researchers are invited to advance more sophisticated analyses than this surface description can provide.

Table 5.6. Distribution of postsecondary credits in calculus and advanced mathematics earned by bachelor's degree recipients among 1982 and 1992 12th graders, by highest level of mathematics studied in high school

	High School Class of 1982 (1982-1993) College credits in calculus advanced mathematics				High School Class of 1992 (1992-2000) College credits in calculus advanced mathematics				Highest high school math of bachelor's recipients, H.S. Class of	
	None	1-4	5-9	>9	None	1-4	5-9	>9	1982	1992
Highest math in High School										
Calculus	25.7 (2.65)	20.4 (2.45)	20.4 (2.46)	33.6 (2.86)	29.7 (2.05)	26.8 (2.39)	15.1 (1.66)	28.3 (2.12)	**14.6 (1.05)**	**22.7 (1.06)**
Precalculus	44.6 (3.36)	14.3 (2.56)	20.3 (3.09)	20.9 (2.74)	53.9 (2.80)	22.1 (2.04)	10.6 (1.51)	13.4 (2.63)	**11.9 (0.93)**	**23.6 (1.40)**
Trigonometry	50.3 (2.80)	19.7 (2.09)	17.4 (1.91)	12.7 (1.83)	66.5 (2.69)	18.9 (2.22)	7.0 (1.27)	7.6 (1.71)	**19.2 (1.17)**	**17.6 (1.17)**
Algebra 2	67.1 (2.23)	16.3 (1.76)	7.9 (1.12)	8.7 (1.27)	76.8 (2.13)	14.9 (1.69)	5.3 (1.29)	3.0 (1.11)	**33.2 (1.41)**	**28.0 (1.22)**
Geometry	78.3 (3.02)	14.7 (2.67)	4.5 (1.29)	2.5 (1.03)	88.0 (2.73)	7.8 (2.23)	2.9 (1.24)	1.3 (0.82)	**13.1 (0.88)**	**6.0 (0.68)**
Algebra 1 and pre-algebra	88.8 (2.86)	8.4 (2.45)	2.5 (1.46)	0.4 (0.22)	87.3 (4.24)	6.6 (3.01)	4.8 (2.53)	1.4 (1.37)	**8.1 (0.70)**	**2.2 (0.40)**

NOTES: (1) Columns for highest high school mathematics may not sum to 100.0 percent because of rounding. (2) Rows for each cohort's distribution of calculus credits may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses. (4) Only students for whom highest math in high school can be determined are included; only students with complete postsecondary records are included. (5) Weighted N for the Class of 1982 bachelor's degree sample = 814k; Weighted N for the Class of 1992 bachelor's degree sample = 793k.
SOURCES: High School & Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

The Content of Degrees, Bachelor's and Associate's, by Major

The next set of tables asks the question, "To what extent do people who earn degrees in one field complete coursework outside that field that nonetheless might be important to both their further education and to the positions they might assume in the work force?" To illustrate some potential indicators of these dimensions of knowledge at the level of the bachelor's degree, two curriculum credit clusters from the files of the Class of 1992 were selected:

- Upper-level coursework in the sciences—i.e., courses that require the prior completion of introductory sequences. Examples include Biochemistry, Plant Morphology, Histology, Genetics, Ethology, Biotechnology, Organic Chemistry, Physical Chemistry, Geophysics, Paleontology, Mineralogy, Modern Physics, Electricity & Magnetism (Intermediate Course), and Physiological Psychology. Biology service courses (e.g., Anatomy and Physiology, Organic Biochemistry) and other science service courses are not included.

- Ethics—includes the core ethics course taught in philosophy, plus courses in environmental ethics, religious ethics, and bioethics.

All the courses cited above carry distinct codes in the taxonomy used to code the 370,000 cases in the NELS:88/2000. Table 5.7 presents credits earned in these clusters in bands. For an alternative presentation of this issue, using mean credits earned by major, and invoking international studies and foreign languages, see Adelman, Daniel, and Berkovits (2003), table 12.

The upper-level science credits distribution in table 5.7 presents some data one might expect: for example, the high percentage of majors in Health Sciences/Services who earned more than four credits in upper-level science. The low percentage of business majors who earned credits in upper-level science courses should also be noted in light of the increasing scientific and technical content of economic life.

The debate as to whether ethics can be taught is as old as the ancient Greek philosophers. Table 5.7 indicates that, depending on major (and exclusive of humanities majors, which include philosophy majors), between 15 and 30 percent of bachelor's degree recipients complete some formal education in ethical issues and analysis. Analysts might wish to explore variances in the type of institutions in which course-taking in ethics is most common.

Table 5.7. Credits earned by bachelor's degree recipients among 1992 12th graders, in selected curriculum clusters outside the student's major

Credits in upper-level science courses[1] earned by bachelor's degree recipients in majors other than life sciences and physical sciences

Major	Number of credits earned: None	1-4	More than 4
Business	77.1 (2.02)	17.0 (1.77)	5.8 (1.11)
Education	67.7 (3.45)	19.6 (2.53)	12.7 (2.42)
Engineering	53.1 (4.49)	22.0 (4.66)	24.9 (3.59)
Math and computer science	69.5 (8.62)	12.5 (3.20)	18.0 (9.47)
Health sciences/services	18.1 (2.57)	19.4 (2.83)	62.5 (3.52)
Humanities	62.1 (5.53)	25.4 (5.92)	12.4 (2.33)
Arts	69.3 (4.55)	20.4 (3.98)	10.2 (2.60)
Social sciences	47.9 (2.51)	31.2 (2.56)	20.9 (1.92)
Applied social sciences	66.7 (2.90)	25.2 (2.70)	8.1 (1.55)

Credits in ethics[2] earned by bachelor's degree recipients, all majors

Major	Number of credits earned: None	1-4	More than 4
Business	70.9 (2.49)	20.1 (2.36)	9.0 (1.44)
Education	82.0 (2.69)	12.7 (2.23)	5.3 (1.58)
Engineering	77.3 (4.51)	13.5 (2.61)	9.2 (4.32)
Physical sciences	73.7 (6.70)	15.8 (4.99)	10.5 (4.51)
Math and computer science	83.3 (3.65)	10.6 (2.71)	6.1 (2.26)
Life science	78.0 (2.41)	13.6 (1.93)	8.4 (1.59)
Health science/services	70.0 (3.50)	23.2 (3.30)	6.8 (1.49)
Humanities	68.4 (4.22)	16.1 (3.00)	15.5 (3.65)
Arts	84.2 (3.34)	12.8 (3.11)	3.0 (1.05)
Social sciences	72.1 (2.26)	19.6 (1.93)	8.3 (1.39)
Applied social science	73.1 (2.65)	22.0 (2.64)	4.9 (1.08)
Other	76.5 (5.75)	18.3 (5.11)	5.2 (2.56)

[1]All courses in biology, chemistry, physics, and geology for which the introductory course in the field is a prerequisite. Examples include biochemistry, bacteriology, field natural history, ornithology, organic chemistry, physical chemistry, geochemistry, mineralogy, quantum physics.
[2]Ethics courses taught under philosophy and religious studies, environmental ethics, and bioethics.
NOTES: (1) Universe consists of all 1992 12th graders who earned bachelor's degrees by December 2000 and whose postsecondary records were complete. Weighted N = 937k. (2) Rows may not add to 100.0 percent because of rounding. (3) Standard errors are in parentheses. (4) For distribution of bachelor's degree majors, see table 5.1.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Associate's degrees awarded by community colleges include both the general transfer oriented A.A./A.S. and the occupationally oriented A.A.S. (the NELS:88/2000 files also include such degree titles as Associate in Business, Associate of Applied Business, Associate of Engineering Technology, and others). The connection between specific majors and the particular type of associate's degree awarded is sometimes a matter of local decision. Thus, for example, the NELS:88/2000 transcript files show business administration and paralegal preparation under both the A.S. and A.A.S. degrees.

Given this range of practice, table 5.8 takes an empirical approach without concern for the precise label of the degree, asking what proportion of those in the High School Class of 1992 who earned associate's degrees from community colleges accumulated credits in two curricular areas that might be used in assessing the quality of degree content.

- **"Level 1" Core Laboratory Sciences**—the basic introductory sequences in biology (including the zoology/botany sequence, when used), chemistry, and physics.

- **Introductory College Level Mathematics**—a broad curriculum cluster that includes finite mathematics, statistics, college algebra, precalculus, and technical mathematics that is grounded in these college-level topics. Students who complete credits at this level of mathematics have indicated that they are truly beyond the levels that would be classified as precollegiate/remedial.

These areas are selected for illustrative purposes, and analysts are invited to use others, for example, computer-related credits or all foreign language credits in determining the content of associate's degrees for students in different majors.

The standard errors for table 5.8 are large, and comparisons of the estimates will yield very few that are statistically significant. But it is worth focusing on the column indicating no credits ("None"), and judging the inverse of the estimates in that column. For example, the potential for transfer from the community college to a 4-year college, regardless of whether one earns an A.A./A.S. or A.A.S. degree, is enhanced by a transcript showing credits in college-level mathematics (Adelman 1994). The reader of table 5.8 will note that community college associate's degree majors in business, engineering technology, and general studies fields all evidence a very positive credit distribution for college-level mathematics. In core level 1 laboratory science, one notices the same type of distribution for majors in engineering technology, health occupations, and general studies. These observations may assist researchers and administrators in generating hypotheses as to the most profitable curricular paths to transfer, and to test the curricular paths for those students who earned associate's degrees against those who may have earned more than 30 credits from community colleges but no degree.

Table 5.8. Credits earned in selected curriculum clusters by 1992 12th graders who were awarded associate's degrees by community colleges, 1992-2000, by associate's degree major

	Number of credits earned			
	None	1-4	5-9	More than 9
Credits in core level 1 laboratory science				
Associate's Major				
Business	53.7 (7.17)	26.7 (7.08)	13.1 (4.31)	6.5 (3.25)
Business support	67.6 (15.1)	11.7 (5.32)	20.7 (16.4)	#
Computer-related	78.4 (9.21)	10.8 (6.22)	10.8 (7.44)	#
Engineering technology	30.9 (7.69)	16.7 (6.33)	29.0 (10.7)	23.5 (7.11)
Health occupations	31.6 (5.69)	21.3 (5.75)	19.7 (4.64)	27.4 (6.60)
Science/mathematics	3.1 (2.91)	21.9 (10.7)	2.7 (1.96)	72.3 (10.3)
Arts and applied arts	47.5 (8.94)	19.9 (8.25)	23.8 (7.68)	8.8 (6.02)
General studies	27.5 (3.19)	30.7 (3.24)	24.0 (3.02)	17.8 (3.05)
Education/human services	40.7 (11.4)	30.2 (11.4)	23.6 (13.3)	5.5 (4.32)
Protective services	53.1 (10.1)	38.0 (9.28)	7.7 (3.37)	2.0 (1.98)
Trades/precision production	85.6 (10.6)	#	12.2 (10.4)	2.2 (2.26)
Credits in introductory college-level mathematics				
Associate's Major				
Business	22.2 (5.14)	21.6 (5.78)	40.3 (6.78)	16.0 (6.75)
Business support	50.1 (13.7)	27.3 (11.6)	2.6 (1.92)	20.1 (16.5)
Computer-related	21.5 (9.85)	54.8 (11.8)	18.9 (8.51)	4.7 (3.78)
Engineering technology	14.7 (6.34)	16.4 (4.94)	40.7 (10.1)	28.2 (7.62)
Health occupations	44.2 (6.79)	32.6 (6.85)	15.9 (4.06)	7.3 (2.78)
Science/mathematics	5.9 (3.95)	22.1 (10.7)	36.5 (9.37)	35.5 (9.34)
Arts and applied arts	38.2 (10.2)	31.0 (8.88)	25.4 (9.32)	5.3 (4.48)
General studies	16.3 (2.86)	35.1 (3.54)	35.4 (3.39)	13.2 (2.62)
Education/human services	63.0 (11.0)	17.0 (7.66)	18.6 (8.18)	1.4 (1.42)
Protective services	55.0 (10.3)	36.9 (9.32)	8.2 (3.47)	#
Trades/precision production	75.1 (12.2)	22.7 (11.9)	2.2 (2.26)	#

Rounds to zero.
NOTES: (1) Universe consists of 1992 12th graders who earned associate's degrees from community colleges by December 2000. Weighted N = 206k. (2) Rows may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses. (4) For distribution of associate's degree majors earned at community colleges, see table 5.4.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

[THIS PAGE IS INTENTIONALLY BLANK]

Part 6:
Undergraduate Grades: A Complex Story

Judging from newspaper articles and editorials, Americans are fascinated by grades in education, almost as fascinated as by indicators of athletic performance in the sports section or various market averages in the business section. In the daily newspaper, grades are similar to earned run averages (ERAs) of baseball pitchers, or the weighted ratings of quarterbacks and mutual fund managers. These are all, putatively, transparent indicators of performance, though we probably understand grades far better than ERAs. Table 6.1 looks across the transcript-recorded postsecondary grades of the three grade-cohort longitudinal studies using two common metrics, the distribution of letter grades and grade point averages (GPAs) of different populations.

The first— and major— point (illustrated in table 6.1) is that, judging by both distribution of letter grades and GPAs, changes have been minor and complex since the high school class of 1972 went to college. In terms of the distribution of letter grades, the proportion of grades that were "A" declined slightly between the Class of 1972 and the Class of 1982, then rose between the Class of 1982 and the Class of 1992. The inverse to this pattern can be observed for the proportions of grades that were "B" and "D." In terms of final undergraduate GPAs, those for women and students who earned bachelor's degrees, as well as among some majors (health sciences and services, social sciences, and applied social sciences), dropped from the Class of 1972 to the Class of 1982, then rose for the Class of 1992.

The more notable issue in changes of grading practices from the 1970s through the1990s is the growing proportion of withdrawals (Ws) and no-credit repeats (abbreviated as NCRs in this document), both of which are now treated as nonpenalty grades by many institutions. There is an unhappy paradox here, however: what is labeled as "nonpenalty" actually involves a more subtle penalty. The time one loses in such situations is time one must recoup at a later point. As table 6.2a (using the Class of 1992) demonstrates, the volume of no-penalty Ws and NCRs has an inverse relationship to highest degree earned, and as table 6.2b indicates, there is a direct relationship between the number of these grades and time-to-degree among those who earned bachelor's degrees. Other features of student postsecondary history interact with the volume of Ws and NCRs, and analysts are invited to consider, for example, the distribution of such grades by institutional selectivity (table 6.3), and the discrete courses with the highest proportion of W and NCR grades (table 6.5).

For both the Class of 1982 and the Class of 1992, table 6.3 presents the distribution of grades by institutional selectivity. Because students may attend institutions of varying selectivity during their undergraduate careers and may also take a course more than once, this table uses the course—not the student—as the unit of analysis.

Table 6.1. Distribution of undergraduate letter grades of 1972, 1982, and 1992 12th graders, and average undergraduate grade point averages (GPAs) of 1972, 1982, and 1992 12th graders, by gender, level of educational attainment, and (for bachelor's degree recipients), bachelor's degree major

	Class of 1972	Class of 1982	Class of 1992
	Distribution of letter-equivalent grades[1]		
As	27.3 (0.34)	26.1 (0.33)	28.1 (0.36)
Bs	31.2 (0.24)	32.8 (0.27)	29.9 (0.23)
Cs	21.9 (0.21)	22.2 (0.23)	18.2 (0.23)
Ds	5.4 (0.14)	5.8 (0.12)	4.6 (0.09)
Fs/penalty grades	3.8 (0.11)	4.8 (0.13)	4.5 (0.14)
Pass/credit, etc.[2]	6.4 (0.15)	2.6 (0.17)	6.4 (0.17)
Withdrawal, no-credit repeat[2]	4.0 (0.13)	6.7 (0.16)	8.3 (0.19)
	Average GPAs for students earning more than 10 credits		
All students	2.70 (.008)	2.66 (.012)	2.74 (.014)
Gender			
Men	2.61 (.011)	2.61 (.018)	2.64 (.020)
Women	2.80 (.011)	2.71 (.016)	2.83 (.017)
Level of attainment			
Less than BA	2.48 (.012)	2.47 (.019)	2.43 (.021)
BA or higher	2.94 (.008)	2.88 (.011)	3.04 (.011)
Bachelor's degree major			
Business	2.78 (.019)	2.79 (.022)	2.98 (.023)
Education	2.98 (.016)	2.93 (.030)	3.16 (.030)
Engineering	2.94 (.032)	2.88 (.044)	3.02 (.051)
Physical sciences	2.94 (.046)	2.89 (.098)	3.05 (.127)
Math/computer science	3.10 (.067)	3.02 (.048)	3.01 (.033)
Life sciences	2.98 (.024)	3.00 (.043)	3.07 (.036)
Health sciences/services	3.02 (.027)	2.90 (.040)	3.11 (.029)
Humanities	3.08 (.031)	3.04 (.038)	3.15 (.046)
Arts	3.06 (.034)	3.05 (.048)	3.14 (.046)
Social sciences	2.95 (.019)	2.85 (.035)	3.03 (.025)
Applied social sciences	2.87 (.023)	2.77 (.036)	2.88 (.028)
Other	3.05 (.048)	2.86 (.116)	2.91 (.054)

[1]All undergraduate grades for all students in all institutions.
[2]Pass, Credit, (no-penalty) Withdrawal, and No-Credit Repeat grades are not included in GPA.
NOTES: (1) The universe of students whose grades are included consists of all 12th graders in each cohort who became postsecondary participants. (2) Standard errors are in parentheses.
SOURCES: National Longitudinal Study of the High School Class of 1972; High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 6.2a. Relationship of number of no-penalty course withdrawals (Ws) and no-credit repeats (NCRs) to highest degree earned for 1992 12th graders, 1992-2000

Percent of students whose highest degree was . . .

Number of Ws and NCRs	None	Certificate	Associate's	Bachelor's	Post-Baccalaureate	Graduate	Percent of students in category
None	22.8 (1.27)	10.5 (0.89)	8.6 (0.77)	36.9 (1.48)	11.1 (0.73)	10.2 (0.79)	**32.7 (0.85)**
1–2	31.9 (1.55)	4.1 (0.66)	9.4 (0.94)	37.0 (1.55)	10.5 (0.83)	7.1 (0.70)	**28.4 (0.75)**
3–6	43.1 (2.07)	4.3 (0.99)	9.7 (1.05)	33.0 (1.71)	7.0 (0.70)	2.8 (0.47)	**24.4 (0.79)**
7 or more	61.0 (2.38)	3.1 (0.93)	10.6 (1.70)	21.5 (1.74)	3.5 (0.68)	0.3 (0.17)	**14.6 (0.67)**

Table 6.2b. Relationship of number of no-penalty course withdrawals (Ws) and no-credit repeats (NCRs) to time-to-degree for 1992 12th graders who earned bachelor's degrees, 1992-2000

Average time-to-degree for bachelor's recipients (in elapsed calendar years)

Number of Ws and NCRs	Years	s.e.	Percent of students in category
None	4.14	(0.033)	**39.1 (1.27)**
1–2	4.45	(0.035)	**31.9 (1.10)**
3–6	5.02	(0.060)	**21.4 (0.99)**
7 or more	5.97	(0.083)	**7.6 (0.56)**

NOTES: (1) Universe consists of 1992 12th graders who subsequently entered postsecondary education. Weighted N for highest degree = 2.09M. (2) Weighted N for bachelor's recipients for whom time-to-degree could be determined = 920k. (3) Rows for highest degree earned and columns for percent of all may not sum to 100.0 percent because of rounding. (4) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 6.3. Distribution of undergraduate grades by institutional selectivity: All institutions attended by 12th graders in the Class of 1982 (1982–1993) and 12th graders in the Class of 1992 (1992–2000)

Institutional selectivity	Percentage of undergraduate grades that were . . . A	B	C	D	F	P	WRPT[1]	Percent of all grades
Highly selective								
Class of 1982	*30.8*	*42.1*	*15.2*	*2.3*	*2.0*	*6.7*	*1.5*	*2.7*
	(1.61)	*(1.40)*	*(1.12)*	*(0.44)*	*(0.31)*	*(0.76)*	*(0.25)*	*(0.36)*
Class of 1992	31.4	33.6	14.8	2.6	1.2	14.9	1.7	3.8
	(2.07)	(1.14)	(1.62)	(0.87)	(0.33)	(1.88)	(0.17)	(0.53)
Selective								
Class of 1982	*26.4*	*38.3*	*21.0*	*4.4*	*2.8*	*3.4*	*3.7*	*10.5*
	(1.01)	*(0.75)*	*(0.76)*	*(0.25)*	*(0.23)*	*(0.30)*	*(0.27)*	*(0.60)*
Class of 1992	30.4	33.8	16.9	3.8	2.5	8.3	4.2	16.5
	(0.85)	(0.58)	(0.59)	(0.22)	(0.20)	(0.45)	(0.29)	(0.82)
Nonselective								
Class of 1982	*24.6*	*33.3*	*23.7*	*6.4*	*4.7*	*2.1*	*5.3*	*57.9*
	(0.42)	*(0.32)*	*(0.28)*	*(0.16)*	*(0.17)*	*(0.14)*	*(0.16)*	*(0.90)*
Class of 1992	29.2	30.8	19.0	5.0	4.1	5.6	6.4	51.9
	(0.48)	(0.29)	(0.32)	(0.12)	(0.18)	(0.18)	(0.17)	(1.02)
Open door								
Class of 1982	*24.2*	*28.6*	*20.8*	*5.6*	*6.4*	*2.3*	*12.1*	*25.5*
	(0.55)	*(0.44)*	*(0.39)*	*(0.18)*	*(0.25)*	*(0.53)*	*(0.41)*	*(0.70)*
Class of 1992	23.4	24.7	18.4	4.9	7.2	5.4	16.0	25.4
	(0.58)	(0.44)	(0.34)	(0.17)	(0.31)	(0.24)	(0.51)	(0.82)
Not rated								
Class of 1982	*34.4*	*31.2*	*17.6*	*4.1*	*3.0*	*7.2*	*2.4*	*3.5*
	(2.14)	*(1.59)*	*(1.62)*	*(0.51)*	*(0.51)*	*(1.62)*	*(0.65)*	*(0.26)*
Class of 1992	36.1	33.1	14.4	3.1	2.1	6.9	4.3	2.4
	(2.24)	(1.58)	(1.42)	(0.44)	(0.43)	(0.89)	(0.91)	(0.25)

[1] Withdrawals and No-Credit Repeats combined.
NOTES: (1) All penalty grades are included under "F." (2) Rows may not sum to 100.0 percent because of rounding. (3) All undergraduate students included. (4) Standard errors are in parentheses.
SOURCES: National Center for Education Statistics: High School & Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

The reader will note the following changes between the Class of 1982 and the Class of 1992:

- In highly selective institutions (accounting for less than 4 percent of all grades in both cohorts), a notable increase in the proportion of grades that were "P"—principally at the expense of grades of "B."
- At selective institutions, an increase in the proportion of grades that were "A" and "P"—at the expense of grades that were "B" and "C." Selective institutions increased their share of all grades from 10.5 to 16.5 percent between the Class of 1982 and the Class of 1992 as a result of both increases in enrollments in flagship state universities and changes in the selectivity ratings of some state universities from nonselective to selective.
- The proportion of Bs declined in all categories of institutions except those that were "not rated."
- Open-door institutions were by far the leaders in the proportion of grades that were Withdrawals (Ws) and No-Credit Repeats (NCRs).

To bring the role of institutional selectivity into the analysis of student-level performance, table 6.4 sets forth bachelor's degree recipients' GPAs over all three grade-cohort longitudinal studies. The reader will note the consistency of the relationship in both the Class of 1972 and the Class of 1982: the more selective the institution granting the bachelor's degree, the higher the student's GPA (no matter how many other institutions—some of differing selectivity—the student had attended). No similar conclusion can be reached for the Class of 1992, however.

Table 6.4. Undergraduate grade point averages (GPAs) of 1972, 1982, and 1992 12th graders who earned bachelor's degrees, by selectivity of the institution awarding the bachelor's degree

Selectivity of institution awarding the bachelor's	Class of 1972 (1972–1984) GPA	S.D.	s.e.	Class of 1982 (1982–1993) GPA	S.D.	s.e.	Class of 1992 (1992–2000) GPA	S.D.	s.e.
Highly selective	3.17	.51	.049	3.09	0.61	.070	3.15	0.48	.058
Selective	3.01	.50	.025	2.94	0.50	.028	3.07	0.44	.021
Nonselective	2.92	.45	.009	2.85	0.50	.013	3.00	0.46	.012

NOTES: (1) Weighted Ns: Class of 1972 = 733k; Class of 1982 = 855k; Class of 1992 = 921k.
SOURCES: National Longitudinal Study of the High School Class of 1972; High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

The transcript evidence shows that grade distributions varied considerably from course to course. Table 6.5 takes eight high-enrollment-volume courses from the Class of 1992 files to illustrate this phenomenon.

Table 6.5. Letter grade distribution in selected high-enrollment-volume undergraduate courses taken by 1992 12th graders: 1992-2000

	Introductory Accounting	Introduct and Intermed Spanish	Tech-nical Writing	Micro-biology	Calculus	Ethics	Organic Chemistry	U.S. Gov't
A	18.1 (0.99)	27.3 (1.44)	34.0 (1.85)	20.6 (2.03)	19.1 (1.16)	31.8 (2.37)	21.8 (1.48)	15.5 (0.89)
B	27.6 (1.12)	29.5 (1.07)	39.1 (1.89)	29.7 (2.64)	25.7 (1.25)	34.5 (1.99)	30.8 (1.49)	29.5 (1.14)
C	22.4 (1.16)	18.4 (1.03)	13.4 (1.35)	31.0 (4.34)	25.8 (1.28)	17.4 (1.40)	25.5 (1.29)	27.3 (1.17)
D	7.6 (0.62)	5.4 (0.52)	2.3 (0.58)	4.7 (0.92)	7.8 (0.94)	4.1 (0.79)	5.5 (1.29)	8.9 (0.76)
F	7.0 (0.58)	4.8 (0.65)	3.5 (0.83)	2.7 (0.59)	5.5 (0.65)	2.2 (0.42)	3.6 (0.57)	6.1 (0.83)
Pass/credit	1.1 (0.30)	4.7 (0.62)	1.6 (0.39)	3.9 (0.88)	3.7 (0.98)	3.1 (1.02)	2.2 (0.48)	0.9 (0.21)
Withdraw	11.1 (0.80)	8.1 (0.70)	5.6 (0.95)	5.5 (1.05)	7.4 (0.69)	6.1 (1.17)	7.1 (0.84)	9.2 (0.90)
Repeat	4.5 (0.45)	1.8 (0.39)	0.5 (0.18)	1.9 (0.84)	6.9 (0.70)	0.8 (0.51)	8.7 (0.63)	2.6 (0.39)
Number of Institutions	**1105**	**959**	**601**	**513**	**674**	**699**	**438**	**1002**
Weighted Cases	**849k**	**961k**	**308k**	**231k**	**691k**	**338k**	**503k**	**827k**

NOTES: (1) Columns may not add to 100.0 percent because of rounding. (2) The universe and weights are those for all known postsecondary participants. (3) The threshold for "high enrollment volume" is 200,000 weighted cases of course-taking over the period 1992-2000. (4) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Nearly two out of every three grades in ethics is an honors grade (A or B), compared with 45 percent in introductory accounting, calculus, and U.S. government—courses in which the withdrawal, repeat, and failure rates were also high. These courses were taken by the NELS:88/2000 postsecondary students in a minimum of 438 institutions (for organic chemistry) to a high of 1,105 institutions (for introductory accounting).[17] Approximately 1 million grades were recorded for introductory and intermediate-level Spanish courses, compared with 231,000 for Microbiology. These are very robust numbers that open up lines of research inquiry for those who wish to add such institutional variables as sector, Carnegie type, and selectivity to the analysis.

Table 6.5 picked high-enrollment-volume courses as its subject, and deliberately selected from different sectors of the disciplinary spectrum. Researchers who wish to investigate the enduring *effects* of grades might start with students' stated intentions of major, identify a set of "gateway" courses in that field and/or related fields, and model the relationship between grades in the gateways to subsequent attainment.

A last topic of interest in the consideration of grades and grading focuses on the courses with the highest percentage of grades that were (1) Withdrawals and Repeats (table 6.6), (2) Penalty Grades (table 6.7), and "As" (table 6.8). All of these are presented for the Class of 1992 only.

- Withdrawals and repeats (table 6.6) are concentrated in remedial courses, mathematics, major lower-division distribution courses such as U.S. history surveys and general chemistry, and introductory-level courses in business and accounting. The same observations concerning remedial and mathematics courses held for the Class of 1982 (see Adelman 1999a, table 6.3, p. 202), despite a different methodology for generating the list (a different threshold of weighted cases was used).

- Failures and other penalty grades (table 6.7) are also concentrated in remedial courses, mathematics, introductory-level courses in business and accounting, and major lower-division distribution courses such as general psychology and introduction to fine arts. The parallel list for the Class of 1982 (see Adelman 1999a, table 6.4, p. 203) was more eclectic.

- The list of courses with the highest proportion of grades that were "A" (table 6.8), like its predecessor for the Class of 1982 (see Adelman 1999a, table 6.5, p. 204), is dominated by teacher education and performing arts.

[17]The NELS:88/2000 postsecondary students attended a total of 3,258 institutions of all kinds, from research universities to vocational schools granting less-than-1-year certificates.

Table 6.6. The 20 undergraduate courses[1] with the highest proportions of Withdrawal (W) and No Credit Repeat (NCR) grades taken by 1992 12th graders: 1992–2000

Course	Percentage of grades that were Ws or NCRs	CCM Code[2]
All	**8.4**	---
Basic algebra	28.8 (1.70)	270103
Intermediate algebra	24.6 (0.99)	270105
College algebra	24.0 (0.85)	270203
Developmental math	20.8 (1.32)	270101
Remedial writing	19.3 (1.13)	232001
Remedial reading	18.2 (1.34)	232002
Precalculus	16.8 (0.97)	270204
Finite mathematics	15.9 (1.85)	270202
Introduction to accounting	14.9 (0.64)	060201
Anatomy and physiology	14.4 (1.32)	260801
Statistics (Math)	14.3 (1.05)	270501
U.S. history surveys	13.8 (0.92)	450810
Calculus for business	13.1 (1.85)	270602
General intro college math	13.5 (1.49)	270201
General chemistry	13.5 (0.68)	400501
English composition	12.8 (0.41)	230401
Introduction to business	12.5 (1.26)	060101
Calculus	12.5 (0.70)	270601
Computer programming	12.3 (1.38)	110201
Logic (Philosophy)	12.1 (1.10)	380103

[1]All NELS:88/2000 undergraduate course grades that were not flagged as transfer courses or credit-by-examination. Only those courses with 150,000 or more weighted enrollments over the period, 1992–2000, were considered. Physical education and personal development courses are excluded on the grounds that they do not contribute to the assessment of *academic* performance. Only nonpenalty withdrawals (Ws) are included. Penalty withdrawals (WF, WU) are included with penalty grades in table 6.7.

[2] "CCM" stands for "College Course Map," and indicates the code in the taxonomy used to code courses. The taxonomy used across all three grade cohort longitudinal studies postsecondary transcript components is set forth in Adelman, C., *The New College Course Map and Transcript Files*, Washington, DC: U.S. Department of Education, 2nd edition, 1999. Modifications to the taxonomy for the NELS:88/2000 data set can be found in NCES 2003-402.

NOTES: (1) The universe of course-takers consists of all 1992 12th graders who became known postsecondary participants. Weighted N=2.09M. (2) Standard errors are in parentheses.

SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 6.7. The 20 undergraduate courses[1] with the highest proportions of failure/penalty grades taken by 1992 12th graders: 1992–2000

Course	Percentage of grades that were F, WF, or U	CCM Code[2]
All	**4.5**	---
Developmental math	14.2 (1.69)	270101
Intermediate algebra	13.5 (1.25)	270105
Basic algebra	13.3 (1.15)	270103
Remedial writing	11.6 (1.48)	232001
Remedial reading	11.4 (1.63)	232002
General intro college math	10.3 (2.05)	270201
Basic academic skills	9.3 (3.52)	320102
Introduction to business	9.0 (2.08)	060101
College algebra	9.0 (0.80)	270203
Intro criminal justice	8.9 (2.65)	430104
Logic (Philosophy)	8.3 (2.07)	380103
Introduction to fine arts	8.1 (2.03)	500701
Calculus for business	7.9 (1.96)	270602
Intro computers/computing	7.9 (0.99)	110102
General psychology	7.9 (0.67)	420101
Precalculus	7.6 (0.68)	270204
Finite mathematics	7.6 (1.86)	270202
Engineering graphics/CAD	7.4 (2.00)	155001
Computer applications: office	7.2 (1.83)	210101
Computer programming	7.1 (1.27)	110201

[1]All NELS:88/2000 undergraduate course grades that were not flagged as transfer courses or credit-by-examination. Only those courses with 150,000 or more weighted enrollments over the period, 1992-2000, were considered. Physical education and personal development courses are excluded on the grounds that they do not contribute to the assessment of *academic* performance.
[2] "CCM" stands for "College Course Map," and indicates the code in the taxonomy used to code courses. The taxonomy used across all three grade cohort longitudinal studies postsecondary transcript components is set forth in Adelman, C., *The New College Course Map and Transcript Files*, Washington, DC: U.S. Department of Education, 2nd edition, 1999. Modifications to the taxonomy for the NELS:88/2000 data set can be found in NCES 2003-402.

NOTES: (1) The 4-point grade scale was formatted as follows: 0-<0.7='F' 0.7-<1.3='D' 1.3-<1.7='C-/D+' 1.7-<2.3='C' 2.3-<2.7='B-/C+' 2.7-<3.3='B' 3.3-<3.6='A-/B+' 3.6-<4.01='A'
(2) The universe of course-takers consisted of all 1992 12th graders who became known postsecondary participants. Weighted N=2.09M. (3) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 6.8. The 20 undergraduate courses[1] with the highest proportions of "A" grades taken by 1992 12th graders: 1992–2000

	Percentage of grades that were A or equivalent	CCM Code[2]
All	**28.4**	---
Music performance	64.2 (1.99)	500903
Teacher Ed: reading education	63.5 (2.46)	131315
Teacher Ed: language arts	53.4 (3.60)	131323
Education: materials and methods	53.1 (2.88)	130302
Theater: acting, directing	52.5 (3.21)	500501
Introduction to special education	51.7 (2.81)	131001
Teacher Ed: physical education	51.6 (3.10)	131314
Mathematics education	49.7 (3.14)	131311
Medical terminology	46.6 (3.72)	172001
Stagecraft, set design	46.2 (4.09)	500405
Dance[3]	45.6 (2.44)	500301
Creative writing	44.5 (3.11)	230501
Intro to education	44.9 (2.52)	130101
Theology	42.4 (3.77)	390601
Intro to Windows and office software	40.4 (4.33)	070802
Women's studies: general	37.9 (3.68)	300701
Basic musicianship, solfeggio	37.3 (2.83)	500901
Educational psychology	34.6 (2.46)	130801
Bible studies	33.1 (2.14)	390201
Ethics (Philosophy)	32.9 (2.65)	380102

[1]All NELS:88/2000 undergraduate course grades that were not flagged as transfer courses or credit-by-examination. Only those courses with 150,000 or more weighted enrollments over the period, 1992-2000, were considered. Physical education and personal development courses are excluded on the grounds that they do not contribute to the assessment of *academic* performance.
[2] "CCM" stands for "College Course Map," and indicates the code in the taxonomy used to code courses. The taxonomy used across all three grade cohort longitudinal studies postsecondary transcript components is set forth in Adelman, C., *The New College Course Map and Transcript Files*. Washington, DC: U.S. Department of Education, 2nd edition, 1999. Modifications to the taxonomy for the NELS:88/2000 data set can be found on NCES 2003-402.
[3]Does not include dance taught under physical education activities.
NOTES: (1) The 4-point grade scale was formatted as follows: 0-<0.7='F' 0.7-<1.3='D' 1.3-<1.7='C-/D+' 1.7-<2.3='C' 2.3-<2.7='B-/C+' 2.7-<3.3='B' 3.3-<3.6='A-/B+' 3.6-<4.01='A'
(2) The universe of course-takers consists of all 1992 12th graders who became known postsecondary participants. Weighted N = 2.09M. (3) Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Part 7:
Special Topic: Remediation

Precollegiate-level coursework undertaken in postsecondary settings is generally labeled "remedial," and is the subject of much contention (Merisotis and Phipps 2000; Breneman and Harlow 1998; Manno 1995). Only 20 percent of undergraduates responding to surveys say they have ever taken a remedial course (Horn, Peter, and Rooney 2002), but the transcript data dispute that figure. Based on analysis of the HS&B/sophomore cohort transcript files, an indicator that combined the types and amounts of postsecondary remedial coursework was developed and presented in Wirt, J. at al, *The Condition of Education, 2000* (Washington, DC: National Center for Education Statistics 2000; indicator 14, p. 52, and supplemental tables 34–1, 34–2, and 34–3, p.152).

The indicator was based on an "if-then-else" logic with five categories:

1. Any courses in remedial reading
2. Two or fewer remedial courses, mathematics only
3. Two or more remedial courses, but no remedial reading
4. One remedial course, not mathematics or reading
5. No remedial courses

The logic was designed to sort out students with the most serious remedial problem (reading) first. Remedial reading was judged to be the most serious remedial problem because two-thirds of the students who required remediation in reading were also enrolled in a minimum of two other remedial courses. The second step sorted out students whose only remedial problem was in mathematics, and who required, at most, two remedial math courses. This is not as intense a remedial configuration as that of the third level of the logic cascade, where 60 percent of the students enrolled in three or more remedial courses other than remedial reading (the logic allowed this combination to include three or more math courses). The fourth step sorted out those students who took only one remedial course other than reading or math. The residual group of students took no remedial courses.

The presentation of this variable in *Principal Indicators* draws on both the HS&B/sophomore cohort and the NELS:88/2000 transcript files and seeks only to establish its basic dimensions and relationships to precollegiate histories.

Figure 2 provides the course category titles and codes used in determining the different remedial course configurations, and requires a gloss. There are some slight differences in the way in which remedial courses were defined in the two transcript files, and the NELS:88/2000 added two codes based on catalog descriptions and indications of nonadditive credit on transcripts.

In general, the content of a course flagged as remedial is distinctly and unquestionably precollegiate, whether or not the credits attached to the course are additive (that is, count toward a credential). Business English is a case in point. It is a course offered exclusively in sub-baccalaureate institutions, and (as catalogue searches confirmed) covers the most basic elements of writing, with an emphasis on punctuation and spelling. This material is precollegiate, but in a trade school certificate program in business support (what was once called "secretarial"), the credits count toward the certificate.

Intermediate algebra, a comparatively high-enrollment-volume course, is a different type of case. In the taxonomy of course categories for the classes of 1972 and 1982, all precollegiate algebra courses were housed under the same code. For the taxonomy of course categories for the Class of 1992, intermediate algebra was split out from this category because, while few (if any) 4-year colleges grant additive credits for the course, a majority of community colleges do grant additive credit, and statewide policies vary in this matter (Crowe 1998). With review of external faculty and registrars' panels, the decision-rule adopted was that cases of intermediate algebra were counted as remedial only if no additive credit was granted on the transcripts.

The category labeled "Other precollegiate math" underwent a transformation in the taxonomy governing the presentation of postsecondary coursework for the Class of 1992 and was dropped from the remedial universe. This decision was reached in the course of examining catalog descriptions of courses that set intermediate algebra as a prerequisite yet basically reviewed and repackaged everything students should have learned in a full high school mathematics program through trigonometry. Additive credit was granted in all cases.

Figure 2. Course categories and codes included in the analysis of postsecondary remediation

	CCM Code[1]	
	HS&B/So	NELS:88/2000
Remedial reading	232002	232002
Remedial English/writing	232001	232001
Remedial speech	232003	232003
ESL	232004	232004
Business English/punctuation	070901	070901
Developmental mathematics	270101	270101
Arithmetic	270102	270102
Basic algebra	270103	270103
Plane geometry	270104	270104
Intermediate algebra	[4]	270105[2]
Business math: arithmetic-based	270901	270901
Other precollegiate mathematics	270199	[3]
Adult basic education	320101	320101
Basic learning skills	320102	320102
Preparatory science	[4]	300104
Preparatory chemistry	[4]	400540

[1] "CCM" stands for "College Course Map," and indicates the code in the taxonomy used to code courses. The taxonomy used across all three grade cohort longitudinal studies postsecondary transcript components is set forth in Adelman, C., *The New College Course Map and Transcript Files*. Washington, DC: U.S. Department of Education, 2nd edition, 1999. Modifications to the taxonomy for the NELS:88/2000 data set can be found in NCES 2003-402.
[2] Counted as remedial only when credits are indicated as nonadditive on transcript.
[3] Category dropped from the remedial course group in the NELS:88/2000.
[4] Category did not exist in the taxonomy used to code the HS&B/So postsecondary transcripts.
SOURCES: High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 7.1 offers a basic portrait of postsecondary remedial work distributed by the 5-category variable, with attention to the timing of postsecondary entry and the nature of the first institution attended. The reader will note:

- In the column for "no remediation," an improvement of approximately 9 percent between the Class of 1982 and the Class of 1992. Using the inverse of this figure, roughly 51 percent of students in the Class of 1982 were enrolled in at least one remedial course at some time in their undergraduate careers, compared with 42 percent of students in the Class of 1992.

- There was no significant change in the proportion of students enrolled in remedial reading between the two cohorts: 11 percent.

- Differences in remedial work by delay of entry into postsecondary education are apparent only in the Class of 1992 cohort.

- In both cohorts, over 60 percent of those whose first institution of attendance was a community college took at least one remedial course. For students first enrolling in 4-year colleges, there was a considerable decline in the proportion enrolling in remedial courses (from 44 to 25 percent).

Table 7.1. Percent of 1982 and 1992 12th graders who took remedial courses in postsecondary institutions, by type and intensity of remedial work, by timing of postsecondary entry and type of first institution attended

	Percent of students taking . . .				
	Any remedial reading	**1-2 courses of remedial math only[1]**	**2 or more other remedial courses** (not reading)	**Only 1 other remedial course** (not math or reading)	**No remediation**
All participants					
Class of 1982	11.1 (0.49)	13.7 (0.56)	16.5 (0.56)	9.3 (0.44)	49.3 (0.82)
Class of 1992	**10.6 (0.68)**	**10.9 (0.60)**	**13.2 (0.69)**	**6.7 (0.36)**	**58.6 (1.04)**
By timing of entry					
Class of 1982					
No delay	11.6 (0.58)	13.8 (0.63)	16.1 (0.66)	9.5 (0.50)	49.1 (0.96)
Delayed	9.8 (1.00)	13.3 (1.22)	18.9 (1.31)	8.9 (1.05)	49.1 (1.85)
Class of 1992					
No delay	**10.6 (0.76)**	**9.8 (0.62)**	**11.4 (0.67)**	**6.8 (0.39)**	**61.4 (1.13)**
Delayed	**9.8 (1.29)**	**15.7 (1.78)**	**22.1 (2.19)**	**6.4 (1.01)**	**46.0 (2.53)**
By type of institution first attended					
Class of 1982					
4-year	9.3 (0.61)	13.6 (0.78)	11.6 (0.67)	9.0 (0.57)	56.4 (1.13)
Community college	15.4 (0.94)	15.2 (0.92)	23.1 (1.03)	9.6 (0.76)	36.7 (1.25)
Other sub-bacca-laureate	3.3 (0.89)	6.8 (1.34)	20.6 (2.40)	10.8 (1.92)	58.5 (2.93)
Class of 1992					
4-year	**5.2 (0.55)**	**7.0 (0.62)**	**6.6 (0.55)**	**6.5 (0.47)**	**74.7 (1.04)**
Community college	**17.8 (1.38)**	**15.5 (1.22)**	**21.0 (1.36)**	**7.0 (0.63)**	**38.9 (1.66)**
Other sub-bacca-laureate	**6.6 (1.34)**	**12.7 (2.85)**	**19.9 (3.71)**	**9.1 (1.95)**	**51.7 (3.85)**

[1] A student with three or more remedial mathematics courses (but no remedial reading) is assigned to the category of "more than one other remedial course."

NOTES: (1) Universe consists of all 12th graders who subsequently were known participants in postsecondary education. Weighted N for Class of 1982 = 1.898M; Class of 1992 = 2.09M. (2) Rows may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses.

SOURCES: High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 7.2 highlights some of the demographic and secondary school background characteristics of students across the remediation spectrum, and invites analysts to look more deeply at these and other associations through multivariate analyses. Among the observations attendant on table 7.2:

- For both the Class of 1982 and the Class of 1992, students from urban high schools were more likely to be taking remedial courses in college than were students from suburban and rural high schools.

- In both cohorts, students from the lowest SES quintile were more likely to be assigned to remedial work than students from the other quintiles, though this phenomenon is more pronounced for the Class of 1992 (in the 1992–2000 period) than for the Class of 1982 a decade earlier.

- While there was a notable improvement for African-American students' remediation participation between the two cohorts (the proportion of those requiring no remedial work rose from 28 to 38 percent), both African-American and Latino students still lagged the other major race/ethnicity groups.

- In a separate multivariate analysis invoking the three major measures of secondary school performance—academic curriculum intensity, class rank/GPA, and senior year test score—the senior year test score proved to have the strongest association with the need for remediation. This association is borne out in the Class of 1992 in the distribution of students across the remediation categories: for example, 4 out of 5 students in the lowest test score quintile took at least one remedial course, compared with less than 1 out of 10 from the highest test score quintile.

For each of the remediation categories, table 7.3 provides a distribution of the students by highest degree earned, comparing the Class of 1982 to the Class of 1992. The reader will note that bachelor's degree completion rates for the Class of 1992 are lower than they are for the Class of 1982 at all levels of remediation except that of "no remedial courses." But the surface data are somewhat deceiving, since the Class of 1982 cohort postsecondary transcript history is 11 years versus 8.5 years for the Class of 1992. There is no way to truncate the HS&B/So student-level data base to match the NELS:88/2000 in this regard because, at the student-level, there are no dates for terms in which individual courses were taken.

Unlike other tables in *Principal Indicators*, all the remediation tables are based on the complete universes of known postsecondary participants, including incidental students. Among incidental students in the Class of 1992, 74 percent took at least one remedial course (Adelman, Daniel, and Berkovits 2003, table 16), well above the 42 percent for the entire cohort.

Table 7.2. Percent of 1982 and 1992 12th graders who took remedial courses in postsecondary institutions, by type and intensity of remedial work, by selected high school background and demographic factors

	Percent of students taking . . .				
	Any remedial reading	**1-2 courses of remedial math only[1]**	**2 or more other remedial courses** (not reading)	**Only 1 other remedial course** (not math or reading)	**No remediation**
All participants					
Class of 1982	11.1 (0.49)	13.7 (0.56)	16.5 (0.56)	9.3 (0.44)	49.3 (0.82)
Class of 1992	**10.6 (0.68)**	**10.9 (0.60)**	**13.2 (0.69)**	**6.7 (0.36)**	**58.6 (1.04)**
By urbanicity of high school					
Class of 1982					
Urban	15.5 (1.30)	14.0 (1.33)	20.5 (1.46)	8.4 (0.94)	41.7 (1.89)
Suburban	9.7 (0.64)	12.9 (0.74)	15.8 (0.73)	9.9 (0.63)	51.6 (1.15)
Rural	10.7 (0.95)	15.0 (1.11)	15.1 (1.05)	9.0 (0.79)	50.2 (1.55)
Class of 1992					
Urban	**13.0 (1.50)**	**11.7 (1.26)**	**15.2 (1.47)**	**6.9 (0.70)**	**53.2 (2.06)**
Suburban	**10.2 (1.07)**	**9.1 (0.82)**	**11.7 (0.91)**	**6.3 (0.55)**	**62.6 (1.53)**
Rural	**9.0 (0.91)**	**11.4 (1.23)**	**13.3 (1.14)**	**7.0 (0.60)**	**58.4 (1.58)**
By SES quintile (100^{th} percentile is high)					
Class of 1982					
81^{st} -100^{th} percentile	7.1 (0.75)	13.0 (1.01)	12.9 (1.02)	9.4 (0.85)	57.5 (1.50)
61^{st} - 80^{th} percentile	9.0 (0.87)	15.5 (1.18)	16.2 (1.12)	10.5 (0.99)	48.8 (1.62)
41^{st} - 60^{th} percentile	10.2 (1.05)	14.1 (1.14)	17.9 (1.33)	10.2 (0.99)	47.6 (1.72)
21^{st} - 40^{th} percentile	15.3 (1.44)	14.5 (1.36)	16.6 (1.47)	7.8 (0.96)	45.9 (1.92)
1^{st} - 20^{th} percentile	17.6 (1.90)	11.7 (1.80)	20.7 (1.95)	10.0 (1.42)	39.9 (2.34)
Class of 1992					
81^{st} -100^{th} percentile	**5.9 (1.21)**	**6.8 (0.73)**	**6.8 (0.75)**	**5.3 (0.73)**	**75.2 (1.47)**
61^{st} - 80^{th} percentile	**10.8 (1.45)**	**10.1 (1.10)**	**12.6 (1.35)**	**7.7 (0.81)**	**58.8 (1.99)**
41^{st} - 60^{th} percentile	**9.9 (1.09)**	**15.4 (1.84)**	**14.2 (1.42)**	**6.2 (0.73)**	**54.3 (2.07)**
21^{st} - 40^{th} percentile	**10.6 (1.12)**	**12.1 (1.10)**	**18.2 (1.91)**	**10.1 (1.31)**	**49.0 (2.16)**
1^{st} - 20^{th} percentile	**22.9 (2.73)**	**12.9 (2.04)**	**22.1 (2.70)**	**5.3 (0.79)**	**36.8 (3.20)**

See notes at end of table.

Table 7.2. Percent of 1982 and 1992 12th graders who took remedial courses in postsecondary institutions, by type and intensity of remedial work, by selected high school background and demographic factors–Continued

	Percent of students taking . . .				
	Any remedial reading	**1-2 courses remedial math only**	**2 or more other remedial courses** (not reading)	**Only 1 other remedial course** (not math or reading)	**No remediation**
By Race/ethnicity					
Class of 1982					
White	7.7 (0.48)	14.5 (0.65)	15.1 (0.61)	9.7 (0.51)	53.0 (0.92)
African-American	31.6 (2.09)	11.6 (1.50)	21.7 (2.11)	7.1 (1.04)	28.0 (1.78)
Latino	20.8 (2.56)	10.3 (1.35)	24.7 (2.06)	7.4 (1.54)	36.8 (2.60)
Asian	12.6 (2.31)	7.3 (1.76)	19.9 (3.12)	11.4 (2.02)	48.7 (3.52)
Class of 1992					
White	**7.2 (0.63)**	**10.7 (0.65)**	**10.9 (0.68)**	**6.9 (0.41)**	**64.4 (1.06)**
African-American	**24.1 (3.24)**	**10.4 (2.42)**	**20.6 (2.87)**	**6.6 (1.54)**	**38.3 (3.41)**
Latino	**20.3 (2.53)**	**13.3 (1.78)**	**23.5 (2.78)**	**6.1 (1.09)**	**36.8 (2.92)**
Asian	**10.0 (2.58)**	**7.7 (2.31)**	**13.4 (3.03)**	**6.8 (1.01)**	**62.0 (6.50)**
By high school senior test score quintile					
Class of 1982					
Highest	2.7 (0.41)	10.4 (0.79)	7.5 (0.70)	8.6 (0.71)	70.9 (1.27)
2nd	6.8 (0.82)	17.8 (1.20)	14.9 (1.10)	11.6 (1.08)	48.9 (1.52)
3rd	14.9 (1.29)	18.1 (1.45)	22.5 (1.39)	8.5 (0.95)	36.1 (1.76)
4th	20.2 (1.54)	10.8 (1.29)	27.8 (1.90)	8.0 (1.06)	33.2 (1.89)
Lowest	31.2 (2.95)	9.1 (2.15)	17.1 (2.23)	7.6 (1.68)	35.0 (3.10)
Class of 1992					
Highest	**0.4 (0.13)**	**3.1 (0.79)**	**1.8 (0.35)**	**3.6 (0.47)**	**91.1 (0.95)**
2nd	**3.9 (0.58)**	**10.4 (0.88)**	**9.3 (1.50)**	**8.7 (0.90)**	**67.7 (1.73)**
3rd	**10.2 (1.35)**	**17.3 (1.82)**	**17.6 (1.51)**	**8.3 (0.79)**	**46.6 (2.15)**
4th	**19.2 (1.87)**	**15.8 (2.11)**	**24.6 (2.10)**	**7.8 (0.91)**	**32.7 (2.67)**
Lowest	**41.1 (3.83)**	**8.6 (1.32)**	**24.0 (3.20)**	**5.5 (1.25)**	**20.7 (2.58)**

[1] A student with 3 or more remedial mathematics courses (but no remedial reading) is assigned to the category of "more than one other remedial course."
NOTES: (1) Universe consists of all 12th graders who became known participants in postsecondary education. Weighted N for Class of 1982 = 1.9M; for Class of 1992 = 2.09M. (2) Rows may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses. (4) For description of Senior Test Score Quintile, see Glossary.
SOURCES: High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Table 7.3. Highest degree earned by 1982 and 1992 12th graders who entered postsecondary education, by type and amount of postsecondary remedial coursework

	Percent of students whose highest degree was . . .				Percent of students in remediation category
	None	Certificate	Associate's	Bachelor's and above	
Total Class of 1982	43.1 (0.86)	7.9 (0.45)	9.1 (0.43)	39.9 (0.88)	
Total Class of 1992	**42.8 (1.03)**	**5.0 (0.43)**	**8.1 (0.50)**	**44.1 (1.08)**	
Remediation type/amount					
Remedial reading					
Class of 1982	57.3 (2.20)	4.6 (0.93)	13.5 (1.61)	24.6 (1.83)	11.1 (0.49)
Class of 1992	**70.0 (2.61)**	**6.2 (1.34)**	**7.2 (0.99)**	**16.6 (2.01)**	**10.6 (0.68)**
Remedial math only: 1-2 courses					
Class of 1982	49.1 (2.14)	4.5 (0.79)	9.8 (1.14)	36.5 (2.03)	13.7 (0.56)
Class of 1992	**58.2 (2.91)**	**4.3 (1.19)**	**10.3 (1.43)**	**27.2 (2.81)**	**10.9 (0.60)**
More than one other remedial course					
Class of 1982	46.9 (1.83)	10.0 (1.16)	17.0 (1.45)	26.1 (1.60)	16.5 (0.56)
Class of 1992	**59.3 (2.67)**	**8.0 (1.52)**	**12.9 (1.91)**	**19.7 (1.98)**	**13.2 (0.69)**
One other remedial course					
Class of 1982	38.4 (2.38)	9.4 (1.58)	10.0 (1.26)	42.1 (2.36)	9.3 (0.44)
Class of 1992	**43.3 (2.85)**	**7.4 (1.61)**	**10.0 (1.29)**	**39.3 (2.75)**	**6.7 (0.36)**
No remedial courses					
Class of 1982	37.8 (1.20)	8.6 (0.65)	5.1 (0.50)	48.6 (1.24)	49.3 (0.82)
Class of 1992	**31.2 (1.22)**	**3.9 (0.48)**	**6.6 (0.61)**	**58.3 (1.31)**	**58.6 (1.04)**

NOTES: (1) Universe consists of all 12th graders who participated in postsecondary education. Weighted N for Class of 1982 = 1.90M; for Class of 1992 = 2.09M. (2) Rows for highest degree may not sum to 100.0 percent because of rounding. (3) Standard errors are in parentheses.
SOURCES: High School and Beyond/Sophomore Cohort, NCES 2000-194; NELS:88/2000 Postsecondary Transcript Files, NCES 2003-402.

Conclusion:
Missing Topics, Data Set Limitations, and Major Learning

Developing national data sets (particularly for longitudinal studies) and learning to use them is somewhat like mastering a piano concerto. First one studies the structure, learns the movements and sub-movements, practices hands separately, practices hands together, finds the difficult passages and plays them backwards. One makes a tape, listens to it, figures out where the passages are rough or where one thinks a different interpretation would enhance the performance. Then, just when one believes oneself to be on the road to Carnegie Hall, one realizes that there is a whole orchestra and orchestral score that surrounds the solo, that sets the stage, and fills in the passages.

The college transcript records are analogous to the solo: they cannot be played without the full orchestra and score. All the topics touched upon in this document to illustrate the power and range of the transcript records are incomplete without connection to the lives of the students who "own" those records. Longitudinal studies are life histories, and college records are but parts of lives.

The longitudinal studies of the National Center for Education Statistics contain a wealth of information. There are surveys of the students that cover aspirations, plans, attitudes, values, family background, family formation, assessments of high school experiences, and labor market experience (jobs, occupations, employers, wages, unemployment, and job satisfaction). There are high school transcripts, test scores, military records, financial aid records, and high school characteristics. For subsamples of the students in the HS&B/sophomore cohort and the NELS:88/2000 there are surveys of parents, teachers, and high school principals. There are thousands of variables, and researchers have found some to be worth more than others.

Without a larger orchestral score that draws critical features of life histories into the pool of explanation, analysis will suffer. Take, for example, the students who earned 60 or more credits but who never earned a degree of any kind *and* who were no longer in school at age 27 (table 3.3). In all three cohorts, this group constituted 1 out of every 12 students who had entered the postsecondary system. The transcript records take us only so far toward figuring out why they did not finish degrees, why they left school, and what it would take to help them finish. Until we see how they differ from other students in terms of high school curricula, family formation, financial aid patterns, geographic mobility, and labor market experience, no one can come up with compelling guidance for college student personnel officers and academic advisors. In his seminal work on college dropouts, Tinto (1987) suggested that institutions develop "early warning systems" that can spot and track students who may have difficulty completing programs. Both the life histories in longitudinal studies and the transcript records can be powerful resources for academic advisors and student personnel officers looking for signs of looming trouble. And it is that kind of guidance to which *Principal Indicators* can be put to use.

Whatever one does with the postsecondary records fits into the life stories that can be aggregated from all this other information. Because they are artifacts, transcripts reveal something new every time one works with them. Over the next few years, researchers will discover the possibility of new variables that can be derived from combinations of transcript and survey data and added to the collection of analytical tools. The themes of some of these variables have not been used in this document, and readers may justly ask, "Why were these themes missing, and what needs to be done to capture them?"

Missing Constructs

Full-Time/Part-Time

The analytical construct of full-time/part-time attendance is missing from the analysis files that produced the data used here for all three longitudinal studies cohorts. Enrollment intensity (another phrase for the construct) on transcript records cannot be derived by algorithm. To do so would require (1) the definition of full-time enrollment in different types of terms (regular semester, summer school, special term, trimester intersession) from each institution, and (2) a term-based count of credits (or credit equivalents) *attempted* for each student. But how does one judge the enrollment intensity of a student who initially enrolls for (attempts) the minimum number of credits for a term that would qualify for "full-time" status, and subsequently withdraws—without penalty—from half of them? Is this a full-time student or a part-time student? And if this student was enrolled, over time, at three different institutions with different definitions of "full-time" and different credit-accounting systems, how can we characterize the student's long-term enrollment intensity?

Based on the unobtrusive, transcript-based evidence, it is very difficult to classify students as full-time/part-time. The default is this case involves referring to the student response to a survey question, "At X {name of institution} have you ever attended less than full-time?" Assume, for a moment, that the threshold for full-time at institution X, on a semester system, is 12 credits. One student attended X for 8 semesters at a minimum of 12 credits, and one semester at 8 credits. Another student attended X for 4 semesters at a minimum of 12 credits, and 7 semesters at 3 credits. A third student enrolled in institution X for 9 credits and institution Y for 3 credits *in the same term* (simultaneous enrollment). All three of these students answer the survey question in the affirmative, and are classified as "part-time" students. Do they belong in the same categorical bin? Or consider: In the NELS:88/2000 survey data, nearly 42 percent of the respondents who claimed to have enrolled in college by 1994 (third follow-up) said that they had attended a postsecondary institution full-time prior to September 1992,[18] in a cohort in which 85 percent of those who graduated from high school received their diplomas in May or June of 1992.

[18]Analysts interested in exploring this datum further can refer to the variable PSEBEGST on the NELS restricted files.

In Carroll's (1989) analysis of students on the "persistence track" (those who entered college full-time immediately following high school graduation), shifting to part-time status was one of the key factors accounting for failure to complete credentials. Carroll's sources of data were student responses to survey questions in the High School & Beyond/Senior Cohort. Students who acknowledge changing enrollment intensity status are offering a story line that is more reliable than transcripts in determining full-time or part-time status. Other studies based on survey data have thus adopted three categories of enrollment intensity—full time, mixed (involving change in status), and part-time (Fitzgerald et al 1994; McCormick, Geis, and Vergun 1995), but *Principal Indicators* declines to do so until researchers have explored the transcript data in more detail. Given the complexities of determining enrollment intensity from transcript data, analysts should follow Carroll's approach or one of the modified versions cited above.

Institutional Control

Principal Indicators also declined to use a second construct that has been a staple of postsecondary analyses: level x institutional control (4-year, 2-year, less-than-2-year by public, private not-for-profit, and private for-profit), principally as a consequence of the complexity of multi-institutional attendance. The data sources for all three grade-cohort longitudinal studies include this information, along with a modified Carnegie typology of 34 classes of institutions,[19] a seven-value special mission institution variable,[20] and the five-value selectivity variable used in tables 1.4, 4.7, 5.3, and 6.3, for example. It is possible, then, to establish a set of grids to describe dimensions of institutional characteristics, for example, Control by Carnegie Type or Control by Special Mission by Selectivity.

One-third of the NELS:88/2000 postsecondary cohort was involved in inter-sectoral attendance patterns (see table 4.2), hence the mapping of student movement across any of these grids is a challenge—made more complex (but potentially revealing) in the NELS:88/2000 by the inclusion of variables that attach credits to each type of institution attended by the student. Ratios of credits from community colleges to credits from 4-year colleges and credits from selective institutions to all undergraduate credits are possible in the NELS:88/2000 data set, and these, along with the mapping of mobility, may ultimately prove more enlightening than the traditional level-by-control presentation.

[19]One should also note that the modified Carnegie typology (and its aggregate version) allows for the grouping of specialized degree-granting schools such as those focusing wholly on music, fine arts, health sciences, and theology. Among non-degree-granting sub-baccalaureate institutions, it allows for distinctions among hospital-based schools of medical support training, cosmetology schools, and schools devoted wholly to computer and technical training. In both these cases (the specialized degree-granting and the subbaccalaureate), one finds all three types of control (public, not-for-profit, and for-profit).

[20]The SPECMISS variable flags institutions as (1) Historically Black Colleges and Universities, (2) Hispanic Serving Institutions, (3) Tribal Colleges, (4) Women's Colleges, (5) Religious-Mission Institutions, (6) No Special Mission: 4-Year, and (7) No Special Mission: 2-Year. A few institutions qualify for more than one flag.

Financial Aid

While the financing of postsecondary education may affect a student's academic history, *Principal Indicators* declined to use any of the financial aid variables in the NELS:88/2000 for the following reasons:

First, the extant data files provide bivariate-coded student responses to questions on the *modes* of financial aid (grants, loans, college work-study, campus job, parental borrowing) only through the third follow-up survey in 1994, that is, given the modal year of postsecondary entry, only for the first 2 years of college. These questions were not asked in the fourth follow-up survey in 2000.

Second, while the restricted file for the fourth follow-up includes 11 variables drawn from the National Student Loan Data System (NSLDS), the range of postsecondary beginning and end dates and last status date on the loans identified in the NSLDS go back to 1966—nearly a decade before anyone in the NELS:88/2000 cohort was born. In other words, there are erroneous data in the NSLDS.

The information on financing postsecondary education available in the NELS:88/2000 is thus very limited, and not comparable to the information available in the two previous longitudinal studies (for example, the HS&B/sophomore cohort data set includes a separate Pell Grant file, and the NLS-72 includes elaborate though self-reported information on types and amounts of grants/scholarships and loans gathered at five points between 1973 and 1986).

For information about the role of financial aid in students' postsecondary histories, researchers and policymakers are better served by the most recent Beginning Postsecondary Students Longitudinal Study (BPS 1996/01).

Creating New Variables

Users of the restricted CD-ROMs for the NLS-72, HS& B/sophomore cohort (NCES 2000-194), and NELS:88/2000 (NCES 2003-402) have an example of a "score" developed for these transcript samples; and it is one they can manipulate whenever they disagree with its assumptions. For example, there is a variable focusing on community college attendance patterns that employs an if-then-else logic. At each step, whatever group of students remains from the previous steps is sorted by criteria that include "more than 10 credits from a community college." (See tables 4.3 and 4.4, which draw on this logic). Some analysts might wish to use a 12 credit threshold. The program is set up so that they can substitute their preference. On the NELS:88/2000 CD, all the programs that generate the variables used in *Principal Indicators* (as well as others) are provided in a supplementary folder. The programs are written in SAS, but can easily be translated into the terms of other statistical packages such as SPSS and STATA.

Major Learning

There are hundreds of tentative conclusions and hypotheses that can be generated from the data presented in *Principal Indicators*. But there is a short list of major learnings that the tables in these pages reveal, and they are worth contemplating in light of contemporary assumptions about the dynamics of student progress after secondary school and traditional lines of research inquiry. In order of consideration above, here are 10 such conclusions:

1. Despite a 50 percent expansion of the population in the system of postsecondary education over the past quarter century, bachelor's degree completion rates for traditional-age students have been stable (tables 2.1 and 2.2).
2. Time-to-degree for traditional-age students who earned bachelor's degrees has not changed over the past quarter century, even though there has been a small increase in average credits earned (table 2.3).
3. Gaps in basic access to postsecondary education by race/ethnicity have narrowed, but gaps remain wide by socioeconomic status (table 2.4).
4. When one looks carefully at the nature and extent of participation in postsecondary education, "access" rates are less than what they seem (table 2.5).
5. Student mobility, geographic and inter-institutional, has increased in volume and complexity, presenting challenges to enrollment management and institutional accountability (tables 1.5 and 4.1 - 4.3).
6. Not all noncompleters are the same. Some demonstrate considerable momentum toward degrees. Others come to postsecondary education with weak academic backgrounds and wind up as incidental students (tables 3.2 and 3.3).
7. Transfer from a community college to a 4-year college, with sufficient time at the community college prior to transfer, has consistently proven to be an effective path to bachelor's degree completion (table 4.4).
8. College credits earned prior to high school graduation in dual-enrollment programs, along with credit-by-examination, reduce time-to-degree (table 4.7).
9. Increases in the study of higher levels of mathematics in high school have mixed effects on participation in mathematics coursework in college (table 5.6).
10. Increases in the proportion of grades that were nonpenalty Withdrawals and No-Credit-Repeats should be of particular concern, as they affect access and course availability (e.g., a student repeating a course blocks another student from sitting in the same seat) (table 6.1).

The reader is invited to add to this list so that this document, in combination with its companion, *The Empirical Curriculum: Changes in Postsecondary Course-Taking, 1972-2000*, becomes a source for future research and discussions of the strengths, lapses, and potential of our system of postsecondary education.

[THIS PAGE IS INTENTIONALLY BLANK]

References

Accreditation Board for Engineering and Technology (ABET), 1992. *Criteria for Accrediting Programs in Engineering in the United States.* New York: Author.

Adam, M. 1999. "Latinos in Education: Where Do We Go From Here?" *The Hispanic Outlook in Higher Education*, vol. 9, no. 16 (April 1999), pp. 21-24.

Adelman, C. 1994. *Lessons of a Generation: Education and Work in the Lives of the High School Class of 1972.* San Francisco: Jossey-Bass.

Adelman, C. 1999a. *The New College Course Map and Transcript Files: Changes in Course-Taking and Achievement, 1972-1993.* Washington, DC: U.S. Department of Education, 2nd edition.

Adelman, C. 1999b. *Answers in the Tool Box: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment.* Washington, DC: U.S. Department of Education.

Adelman, C., Daniel, B., and Berkovits, I. 2003. *Postsecondary Attainment, Attendance, Curriculum and Performance: Selected Results from the NELS:88/2000 Postsecondary Education Transcript Study*. Washington, DC: National Center for Education Statistics.

Allen, W. 1992. "The Color of Success: African-American College Student Outcomes at Predominantly White and Historically Black Public Colleges and Universities. *Harvard Educational Review*, vol. 62, pp. 26-44.

Alexander, K.L., Holupka, S., and Pallas, A.M. 1987. "Social Background and Academic Determinants of Two-Year versus Four-Year College Attendance: Evidence from Two Cohorts a Decade Apart." *American Journal of Education*, vol. 96, pp. 56-80.

American Council on Education 1991. *Setting the National Agenda: Academic Achievement and Transfer*. Washington, DC: Author.

Astin, A. 1975. *Preventing Students from Dropping Out.* San Francisco: Jossey-Bass.

Astin, A.W., Tsui, L., and Avalos, J. 1996. *Degree Attainment Rates at American Colleges and Universities: Effects of Race, Gender, and Institutional Type*. Los Angeles: Higher Education Research Institute, UCLA.

Berkner, L., Horn, L., and Clune, M. 2000. *Descriptive Summary of 1995-96 Beginning Postsecondary Students: Three Years Later*. Washington, DC: National Center for Education Statistics.

Berkner, L., He, S., and Cataldi, E.F. 2002. *Descriptive Summary of 1995-96 Beginning Postsecondary Students: Six Years Later*. Washington, DC: National Center for Education Statistics.

Boswell, K. 2001. "State Policy and Postsecondary Enrollment Options," in Robertson, P.F., Chapman, B.G., and Gaskin, F., *Systems for Offering Concurrent Enrollment at High Schools and Community Colleges*. San Francisco: Jossey-Bass.

Bradby, D. 1992. *Language Characteristics and Academic Achievement: A Look at Asian and Hispanic Eighth Graders in NELS:88*. Washington, DC: National Center for Education Statistics.

Breneman, D. and Harlow, W. 1998. *Remediation in Higher Education*. Washington, DC: Thomas B. Fordham Foundation.

Cabrera, A. and La Nasa, S.M. 2001. "On the Path to College: Three Critical Tasks Facing America's Disadvantaged." *Research in Higher Education*, vol. 42, no. 2, pp. 119-150.

California Postsecondary Education Commission, 1988. *Time to Degree in California's Public Universities: Factors Contributing to Length of Time.* Sacramento: Author.

Carroll, C.D. 1989. *College Persistence and Degree Attainment for 1980 High School Graduates: Hazards for Transfers, Stopouts, and Part-Timers.* Washington, DC: National Center for Education Statistics.

Choy, S.P. and Moskovitz, R. 1998. *Student Financing of Graduate and First-Professional Education, 1995-96: With Profiles of Students in Selected Degree Programs.* Washington, DC: National Center for Education Statistics.

Cohen, A. 1993. "Analyzing Community College Student Transfer Rates." Paper presented at the annual meeting of the American Educational Research Association, Atlanta, GA, April 1993.

Cohen, A. and Brawer, F.B. 1996. *The American Community College*, 3rd edition. San Francisco: Jossey-Bass.

Crowe, E. 1998. *Statewide Remedial Education Policies*. Denver, CO: State Higher Education Executive Officers.

Curtin, T.R., Ingels, S.J., Wu, S., and Heuer, R. 2002. *National Education Longitudinal Study of 1988: Base-Year to Fourth Follow-up Data File User's Manual*. Washington, DC: National Center for Education Statistics.

DesJardins, S.L., McCall, B.P., Ahlburg, D.A., and Moye, M.J. 2002. "Adding a Timing Light to the 'Toolbox'," *Research in Higher Education*, vol. 43, no. 1, pp. 83-114.

Dey, E.L. and Astin, A.W. 1989. *Predicting College Student Retention.* Los Angeles: Higher Education Research Institute, UCLA.

Eaton, J. 1994. *Strengthening Collegiate Education in Community Colleges*. San Francisco: Jossey-Bass, 1994.

Fitzgerald, R. et al. 1994. *Descriptive Summary of 1989-90 Beginning Postsecondary Students: Two Years Later*. Washington, DC: National Center for Education Statistics.

Florida Council for Education Policy, Research, and Improvement, 2002. *Postsecondary Progression of 1993-94 Florida Public High School Graduates: 2002 Update.* Tallahassee, FL: Author.

Garber, R. "Degree/Certificate Outreach: Finding the Students Who Have Completed [Associate's] Degrees and Certificate [Programs]." Paper presented at the annual convention of the American Association of Community Colleges, Seattle, WA, April 2002.

Goodman, T.G., Lathan, S.C., Copa, J.C. and Wright, D.L. 2001. *Ready or Not, Here They Come: A Longitudinal Analysis of the Effect of Acceleration and Remediation on Baccalaureate Degree Attainment.* Paper presented at the Association for Institutional Research Annual Forum, Long Beach, CA.

Hearn, J.C. 1992. "Emerging Variations in Postsecondary Attendance Patterns: An Investigation of Part-Time, Delayed, and Nondegree Enrollment." *Research in Higher Education,* vol. 33, pp. 657-687.

Hoffman, C., Snyder, T. and Sonnenberg, W. 1992. *Historically Black Colleges and Universities, 1976-1990*. Washington, DC: National Center for Education Statistics.

Horn, L. 1998. *Stopouts or Stayouts? Undergraduates Who Leave College in Their First Year*. Washington, DC: National Center for Education Statistics.

Horn, L., Peter, K., and Rooney, K. 2002. *Profile of Undergraduates in U.S. Postsecondary Institutions: 1999-2000*. Washington, DC: National Center for Education Statistics.

Horn, L. and Kojaku, L.K. 2001. *High School Academic Curriculum and the Persistence Path Through College.* Washington, DC: National Center for Education Statistics.

Houston, W. and Sawyer, R. 1991. *Relating Scores on the Enhanced Act Assessment and the SAT Batteries.* Iowa City, IA: American College Testing Service.

Johnstone, D.B. and de Genio, B. 2001. *College-Level Learning in High School: Purposes, Policies, and Practical Implications.* Washington, DC: Association of American Colleges and Universities.

Jones, E. B. 1991. *A Model for Deriving the Transfer Rate*. Washington, DC: American Association of Community Colleges.

Kaufman, P., Chavez, L., and Lauen, D. 1999. *Generational Status and Educational Outcomes Among Asian and Hispanic 1988 Eighth Graders.* Washington, DC: National Center for Education Statistics.

Kim, M.M. 2002. "Historically Black vs. White Institutions: Academic Development Among Black Students, *The Review of Higher Education*, vol. 25, no. 4 (2002), pp. 385-407.

Korb, R., Schantz, N., and Zimbler, L. 1989. *Student Financing of Graduate and Professional Education.* Washington, DC: National Center for Education Statistics.

Manno, B.V. 1995. "Remedial Education: Replacing the Double Standard With Real Standards." *Change*, vol. 27, no. 3, pp. 47-49.

McCormick, A.C. 1999. *Credit Production and Progress Toward the Bachelor's Degree: An Analysis of Postsecondary Transcripts for Beginning Students at 4-Year Institutions.* Washington, DC: National Center for Education Statistics.

McCormick, A.C. 1997. *Transfer Behavior Among Beginning Postsecondary Students, 1989-94.* Washington, DC: National Center for Education Statistics.

McCormick, A.C., Geis, S. and Vergun, R. 1995. *Profile of Part-Time Undergraduates in Postsecondary Education, 1989-90.* Washington, DC: National Center for Education Statistics.

Merisotis, J.P. and Phipps, R.A. 2000. "Remedial Education in Colleges and Universities: What's Really Going On? *The Review of Higher Education*, vol. 24, no. 1, pp. 67-85.

Sax, L.J., Astin, A.W., Korn, W.S., and Mahoney, K.M., 1995. *The American Freshman: National Norms for Fall 1995.* Los Angeles: Higher Education Research Institute, UCLA.

Smith, T.Y. (ed.) 1998. *The Retention and Graduation Rates of 1989-96 Entering Freshmen Cohorts in 232 U.S. Colleges and Universities.* Norman, OK: Center for Institutional Data Exchange and Analysis.

Snyder, T.D. 2002. *Digest of Education Statistics, 2001*. Washington, DC: National Center for Education Statistics.

Stearns, C. and Watanabe, S. 2002. *Hispanic Serving Institutions: Statistical Trends from 1990 to 1999.* Washington, DC: National Center for Education Statistics.

Steppanen, L. 2000. "For Students Who Never Transfer What Happens?" Paper presented at the Association for Institutional Research Annual Forum, Cincinnati, OH.

Texas Higher Education Coordinating Board, 1996. *Ten Strategies and Their Financial Implications for Reducing Time-to-Degree in Texas Universities.* Austin, TX: Author.

Tinto, V. 1987. *Leaving College: Rethinking the Causes and Cures of Student Attrition.* Chicago: University of Chicago Press.

U.S. Bureau of the Census, 1993. *Current Population Report Series* P25-1106. Washington, DC: Author.

U.S. Bureau of the Census, 1984. *Current Population Report Series* P25-957. Washington, DC: Author.

Webb, E. et al, 1966. *Unobtrusive Measures.* Chicago: Rand-McNally.

Windham, P. and Perkins, G.R. 2001. "Dual Enrollment as an Acceleration Mechanism: Are Students Prepared for Subsequent Courses?" Paper presented to the Annual Forum of the Association for Institutional Research, Long Beach, CA, June 2001.

Wirt, J. et al, 2000. *The Condition of Education, 2000*. Washington, DC: National Center for Education Statistics.

[THIS PAGE IS INTENTIONALLY BLANK]

APPENDIX A

Principal Features of the NCES Grade-Cohort Longitudinal Studies

[THIS PAGE IS INTENTIONALLY BLANK]

APPENDIX A

Principal Features of the NCES Grade Cohort Longitudinal Studies

There are four grade-cohort longitudinal studies designed and conducted by the National Center for Education Statistics. Three of these studies have been completed. They are:

- National Longitudinal Study of the High School Class of 1972 (NLS-72), which started with a cohort of Seniors in the spring of 1972, and concluded in 1986.
- High School & Beyond, which started with a cohort of Seniors in 1980, and concluded in 1986; and started with another cohort of Sophomores in 1980 (HS&B), and concluded in 1993.
- National Education Longitudinal Study of 1988, which was initiated with an 8th grade class in 1988 (NELS:88), and concluded in 2000.

The data for the above studies are available in both public release and restricted (license required) form on CD, with electronic code books (ECBs) listing all variables, with descriptions and distributions.

The fourth study, the Education Longitudinal Study of 2002 (ELS:2002), started with a sample of 20,000 10th grade students in the spring of 2002, and is currently in progress.

Curtin, Ingels, Wu and Heuer 2002 offer a figure with a temporal presentation of the four longitudinal studies,[21] highlighting their component and comparison points. Each of the studies begins with a national probability sample involving a stratified sample of schools and a random sample of students within the target grade in those schools. In some cases, the samples are refreshed at later points in the longitudinal study (NELS:88 in 1990 and 1992), and in some cases augmented at a later point (NLS-72 in 1973).

The important points are that each of these longitudinal studies includes a great deal more information than what is used in *Principal Indicators*, and that not all of them are comparable in terms of the depth with which various topics are explored. The surveys of the NLS-72 were focused wholly on students, whereas those of the subsequent longitudinal studies included parents, teachers, and secondary school administrators. The cognitive tests administered in the 12th grade to the NLS-72 were administered in the 10th and 12th grades to subsequent cohorts, thus enabling measures of intellectual growth. Labor market histories were far more detailed in the NLS-72 and HS&B/Sophomore cohort than they were for the NELS:88/2000. Military records exist for the NLS-72 but not for any subsequent study. The shift from paper-and-pencil survey response forms to computer-assisted telephone interviews (CATI) in the 1990s constricted the range of questions asked (e.g., there was no time to ask students about reasons for changing

[21] Curtin, T.R., Ingels, S.J., Wu, S., and Heuer, R. (2002). *National Education Longitudinal Study of 1988: Base-Year to Fourth Follow-up Data File User's Manual* (NCES 2003-323). Washington, DC: U.S. Department of Education, National Center for Education Statistics (http://nces.ed.gov/pubs2002/2002323.pdf, p.3).

majors, reasons for transferring from one college to another, and degrees of satisfaction with different aspects of postsecondary experience, whereas the NLS-72 paper survey forms covered these topics in some depth).

Nonetheless, the archives of these data sets are the richest we have to explore the nature of secondary and postsecondary education and its consequences in the early adult life histories of Americans over the past 30 years.

APPENDIX B

Decision Rules for Data Entry:
NELS:88/2000 Postsecondary Transcript Files

[THIS PAGE IS INTENTIONALLY BLANK]

APPENDIX B:
Decision Rules for Data Entry, NELS:88/2000 Postsecondary Transcript File

For the NELS:88/2000 Postsecondary Transcript Files, the procedures used to transform paper transcripts from a wide variety of postsecondary institutions into course-level and degree-level data files include monitoring the receipt of transcripts from the primary contractor, identifying missing transcripts or data, retrieving missing information, entering course and transcript information, coding courses using the 1999 taxonomy of *The New College Course Map and Transcript Files* (2nd edition), checking the quality of data entry and coding, and preparing the paper documents for archival storage. This appendix shares the instructions to data entry personnel responsible for entering basic course and transcript information.

Instructions for Primary Data Entry: the COURSE File

During the 1-year course of primary data entry, there were a total of 32 data entry clerks, each of whom was trained in the basic protocols prior to beginning work. The data entry clerks' principal responsibility was the Course file, with each completed file given an identifying number by school (i.e., S+the 6-digit IPEDSID). Nontraditional transcript schools were entered by the project director in the same manner.

EXCERPTS FROM INSTRUCTIONS TO DATA ENTRY STAFF

Variables for the COURSE File

Data Entry Rules/Guidance:

- A line entry contains values (including missing) for all 10 variables listed below and for a specific instance of course-taking.
- Within TID [Transcript ID], order line entries by TERMDATE, starting with the earliest entry.
- Each line entry must have a sequential CRSENUM following the order of TERMDATEs.
- Line entries and CRSENUMs include transfer courses and blocks of transfer credits.
- Enter the transfer courses/credits first. If no specific dates are attached to the courses, use 1 month prior to the first TERMDATE for the student at the institution whose transcript you are looking at. For example, if the student's first real course was taken in 1992.67 (September 1992), then the transcript block would be dated 1992.58 (August 1992).
- Truly missing information in variable field receives a value of -1.

Variable	Order	Type	Maximum Length	Position	Comments
TID	1	Num	6	1	Transcript ID; always 6 digits
IPEDSID	2	Num	6	8	Institution Code; always 6 digits
CRSENUM	3	Num	4	15	Sequential (01,02,03...) Each line entry has a unique CRSEID
TERMDATE	4	Num	4	20	See description, e.g., 1992.67
TERMTYPE	5	Num	1	27	[See attached list of values]
CRSEID	6	Char	8	29	If indicated, this is the catalog code for the course at the institution, e.g., COMPSCI 112, ENG452. It may not be indicated–in whichcase the field is missing (-1). Try not to use more than 7 spaces.
CRSENAME	7	Char	30	38	Literal title of course. Be careful of abbreviations. The title has to make sense to the course coder. Sometimes, the institution abbreviates in obscure ways. Save these for Problem Resolution Sessions.
CRSECODE	8	Num	6	66	CCM Code, the most critical entry in the whole collection. You will not enter this code. Instead, you will put a period (.) at position 66.
CRSECRED	9	Num	4	73	*Attempted* (not earned) credits for course as indicated on the transcript. Sometimes these are expressed in clock-hours. Some courses carry 0 credits. There are special instructions for situations involving No-Credit-Repeats and nonadditive credits in remedial courses.
CRSGRADA	10	Char	4	78	Literal grade, letter or number. Again, there are special instructions for repeats, credits-by-examination, transfer courses, and other odd cases. Follow instructions on the sheet, “The Only Grades We Use.”

Elaboration was provided on the variables TERMDATE, TERMTYPE, CRSECRED, and CRSGRADE. All months were expressed in fractions of 1/12th of a calendar year, with January set to 0:

January	.00	February	.08	March	.17
April	.25	May	.33	June	.42
July	.50	August	.58	September	.67
October	.75	November	.83	December	.91

The reason for adopting this system was to enhance the accuracy of measuring time-to-degree across Y2K. The particular applications of these dates to the different TERMTYPES are included in the following guidance to the data entry staff :

TERMTYPE:

		Date Rules	
1	SEMESTER	Fall =	September (.67)
		Spring =	January (.00)
		Summer =	June (.42)
2	QUARTER	Fall =	September (.67)
		Winter =	January (.00)
		Spring =	April (.25)
		Summer =	July (.50)
3	TRIMESTER	Depends on the school.	
	For 4-1-4	Fall =	September (.67)
		Winter =	January (.00)
		Spring =	February (.08)
	For 4-3-4	Fall =	September (.67)
		Winter =	February (.08)
		Spring =	May (.33)
4	CLOCK HOUR	Whatever month it says, but consult project director if all dates are the same or if the indication is of an ending date, not a start date	
5	EXAMINATION	If dated, use the date If undated, use one month prior to the student's first term of courses	
6	SPECIAL	Whatever month it says	
7	TRANSFER	If dated, use the date If undated, use one month prior to the student's first term of courses	

8	STUDY ABROAD	If dated, use the date If undated, look for a notation of when the student was on leave: use the front-end date of the leave period
9	GED/ADULT BASIC	[the entire record must be comprised of such coursework; every term type will then be = 9; dates are whatever it says]

As for credits and grades, most institutions submitted a guidance or "poop sheet" along with the transcripts. Data entry staff were asked to read these guidances, and then to observe standardization protocols contained in the following:

BEFORE ENTERING DATA FROM A GIVEN SCHOOL, PLEASE READ THE GUIDE TO INTERPRETING TRANSCRIPTS THAT MOST SCHOOLS ENCLOSE WITH THE TRANSCRIPTS. THIS GUIDE WILL TELL YOU HOW TO TRANSLATE GRADES.

WE USE ALL OF THE FOLLOWING GRADES:

	Credits	Exceptions on Credits
Standard Letter Grades		
A/B/C/D with + and -	Attempted	Remedial = 0
F, E	Attempted	Phys Ed if 0 Labs if listed 0
Number Grades		
4-point scale (0-4)	Attempted	[same as for letter grades]
0-100	Attempted	[same as for letter grades]
Other Letter Grades		
H, HP, P, S in cases where that is the grading system (usually in med schools)		
W, WP, WF	Attempted	[same as for letter grades]
AU (audit)	0	
NG (ungraded courses)	Attempted	[same as letter]
P (pass)	Whatever it says	[same as letter]
CR (credit)	Whatever it says	[same as letter]
NP (no pass–examination only)	0	
TR (transfer)	Whatever it says	
S, U	Attempted	[same as letter]
NCR (no credit repeat)	0	
DR (drop, as during drop/add period)	0	
I (incomplete–unresolved)	Attempted	[same as letter]
IP (in process–Year 2000 only)	Whatever it says	

WE DO NOT USE ANY OTHER GRADES—no Xs, Zs, Qs, Ms, etc.

FURTHER GUIDANCE ON GRADES/CREDITS

1. Look at the **local course numbering system** to assist in judgments on nonadditive credits for remedial/developmental courses. If the local number has 3 digits and begins with a 0, the chances are high that the credits are nonadditive. Hence, we enter 0 for the credits. The one course in this category on which we defer to local judgment and custom is Intermediate Algebra. In many community colleges, the credits for this course are additive.

2. **Incompletes.** Look down the transcript to determine, first, whether the I grade was resolved. If so, enter the final grade—not the I—at the position of the first entry for that course. Do not enter the course twice.

3. **IP (In Progress) with dates before 2000.** Sometimes, you are looking at a full-year or multi-term course. Determine whether the course appears again, with the same local number, in the next term. If so, replace IP with the final grade for the course as recorded in the next (or penultimate) term. If there is no resolution, the IP will become a penalty grade.

4. **NCRs.** Repeats are sometimes indicated with an asterisk, an "R" in the transcript margin, or another notation. If the transcript poop sheet provides guidance on Repeat policy (i.e., how many times a course can be repeated without penalty), follow the poop sheet. If there is no guidance, we use NCR (with 0 credits) only on the *first* occasion of course-taking. Whatever happens after that, happens.

5. **Ws, WPs, WFs.** The only times we allow 0 credits for any kind of withdrawal other than a drop (DR) are for remedial/developmental courses, phys ed activities courses, music performance courses, and other noncredit phenomena. If the school uses 0 credits for a regular credit-bearing course with a W of any kind, we replace that 0 with the default number of credits for that type of course according to that school's academic calendar (semester, quarter, trimester). For example, a W in a US History survey course in a semester school gets 3 credits. Why do we do this? Because we want to be able to determine what proportion of initially enrolled credits students withdraw from.

6. **Resolution of out-of-scope grades** (e.g., V, Q, etc.) with no poop sheet guidance. Look at the difference between credits attempted and credits earned. If there are 0 credits earned for such a grade then it's either some kind of W, a no credit (NC) situation, or a penalty grade. The kind of course will tell you whether it is potentially no credit (NC). Look at the GPA for that term, where stated (usually, term GPAs are stated). That will help you determine whether the V or Q or whatever is a penalty grade. If so, change the V or Q to a U.

7. Examination terms (Term Type=5). If no letter grade is used (as in the case of Advance Placement exams or CLEPs), we use CR—provided that credits are awarded, and NC when no credits are awarded. The major exceptions involve the state basic skills tests for public institutions in Florida (CLAST), Texas (TASP), and Georgia (RTP). In those instances, it's simply Pass (P) or No Pass (NP).

[THIS PAGE IS INTENTIONALLY BLANK]

APPENDIX C

Technical Issues

[THIS PAGE IS INTENTIONALLY BLANK]

APPENDIX C
Technical Issues

Accuracy of Estimates and Standard Errors

There are different kinds of statistics in *Principal Indicators*, but all of them are estimates derived from samples.

Two kinds of error occur when samples are at issue: errors in sampling itself, particularly when relatively small sub-populations (for example, American Indians) are involved; and non-sampling errors. Even in surveys as large as the three grade cohort longitudinal studies used in *Principal Indicators*, sampling errors can affect estimates of statistical significance.

Non-sampling errors are more serious matters. A good example of a non-sampling error would be the fact that transcripts are missing for some students in all three grade cohort studies. The transcripts are missing either because the student did not tell the interviewer that he/she attended the school (and there were no transfer credits on another transcript to identify the school), the school refused to send the transcript, the school could not find the transcript, or the information sent by the school was not really a transcript. In this case, we can mitigate the effect of missing transcripts by differential weighting of the population, and, indeed, for both the High School & Beyond/Sophomore and NELS:88/2000 files, the analyst is given a choice of weights, one of which is confined to students with complete records. Weighting, though, will not address the panoply of non-sampling errors.

The effects of sampling and non-sampling errors ripple through data bases. To judge the accuracy of any analysis, one needs to explicate and judge these effects. When the unit of analysis is the student, this is a straightforward issue because the original samples in the longitudinal studies consisted of students. When questions are asked about highest degree earned (table 2.1), undergraduate credits earned (table 2.3), multi-institutional attendance patterns (table 4.2), or undergraduate grade point average (table 6.1), the questions are about nonrepetitive behaviors of the students who were sampled. One does not have two highest degrees earned or two undergraduate GPAs.

When the unit of analysis is an instance of the distribution of grades within institutional types (table 6.3) or within course categories (table 6.5), the statistical issues are not so straightforward. While these units of analysis involve student behavior, that behavior is usually repetitive. A student may make five attempts at degrees in two different fields in three different types of colleges. A student may take courses in the same category, for example, electrical engineering, in two different institutions and receive different numbers of credits and different grades on each occasion. Ten—and only ten—students out of 9,000 may take a dozen courses in the same broad category, for example, chiropractic, and receive grades of ‘A’ for all of them. All these cases render the tasks of weighting the data and determining its accuracy more difficult. In fact, these cases illustrate the differences between analysis of transcripts and analysis of survey responses.

The descriptive comparisons in *Principal Indicators* dealing with nonrepetitive student behaviors require invocation of the "Student's *t*" statistic to determine whether the difference between two independent estimates is significant. The formula for computing "Students' *t*" values is:

$$t = (P_1 - P_2) \div \sqrt{(se_1^2 + se_2^2)}$$

where P_1 and P_2 are the estimates to be compared and se_1 and se_2 are the corresponding standard errors. In this case, if $t \geq 1.96$, one has a statistically significant difference at $p \leq .05$, a standard marker. The formula becomes more complex, however, for multiple comparisons among categories of an independent variable such as race/ethnicity. For multiple comparisons, the critical value for *t* rises depending on the number of comparisons that can be made in the family of the independent variable. For race/ethnicity presented in 5 categories, there are10 possible comparisons, so the significance level of each test must be $p \leq .05/10$ or $p \leq .005$. To determine the significance level of *t* values in any comparison of means or proportions, the result should be matched against standard published tables of significance levels for two-tailed hypothesis testing.

When estimates are not independent, a covariance term must be added to the *Student's t* formula

$$t = (P_1 - P_2) \div \sqrt{(se_1^2 + se_2^2) - 2(r)se_1se_2}$$

where *r* is the correlation between the two estimates. The determination of correlations requires a statistical software package such as SAS or SPSS and the invocation of proper weights for the comparison.

Because none of the three grade cohort longitudinal studies used in *Principal Indicators* was based on a simple random sample of students, the technique for estimating sampling error involves a more complex approach known as the Taylor series method. To produce Taylor series standard errors, the estimates presented in *Principal Indicators* used AM, a program developed by Jon Cohen and Associates at the American Institutes for Research under contract to the National Center for Education Statistics. With the exceptions of the standard errors provided in Appendix B, *Principal Indicators* placed the standard errors in the tables themselves, so that readers familiar with the 'Students' *t*' and its variations can quickly determine statistical significance of the estimates.

Flags and Weights

Each of the grade cohort studies used in *Principal Indicators* carries a complex set of flags and weights to mark the populations for which estimates are to be generated. The selection of these flags and weights is extremely important for both the accuracy and meaningfulness of estimates.

For purposes of the topics covered in *Principal Indicators*, the oldest of the data sets, the Class of 1972, is the least complicated. One weight was developed for the postsecondary transcript sample. This weight was based on the 4th follow-up survey sample (in 1979) when students were asked what postsecondary institutions they had attended up to that point, when they attended, what degrees they had earned, and so forth. After the transcripts were gathered in 1984 and the

first postsecondary transcript files developed, a flag was added to limit the population to those for whom transcripts were received. The analyses of Class of 1972 data in *Principal Indicators* use WT1 and set INPETS=1. A separate flag for 12th grade status in 1972 is not necessary because everyone in the Class of 1972 was in the 12th grade in 1972.

For the postsecondary transcript sample of the High School & Beyond/Sophomore cohort, the process was more complex. Using the weights for the first follow-up survey (1982, the scheduled 12th grade year for this cohort), three postsecondary transcript weights were developed. The first weight was based on a ratio of the sum of weights for all students in the 1982 panel who subsequently (in surveys of 1984, 1986 or 1992) claimed to have attended a postsecondary institution to the sum of weights for those for whom a transcript validating the claim was subsequently received. The ratio was then modified by factors derived from the stratification cells in the 1982 survey design to create multipliers that were applied to the raw weights for the students for whom transcripts were received or for whom postsecondary attendance was imputed from survey story-line characteristics. This is a generous formulation for all likely postsecondary participants.

The second High School & Beyond/Sophomore weight involved the same procedure as the first but applied a more restrictive ratio to those students for whom a true postsecondary transcript was received. These students are more than "likely" participants: they are "known participants." The third weight followed the same procedure as the second, but confined the population to only those students with complete postsecondary records (i.e., no missing transcripts). This weight is used in analyses of credit production and grades, since complete records are necessary for the analysis of both these features of student academic history. These weights are labeled PSEWT1, PSEWT2, and PSEWT3.

To accompany these weights for the comparisons in *Principal Indicators* that hold the population to students who were in the 12th grade in 1982, a special flag, SENRFLAG, was constructed from variables in the High School and Beyond/Sophomore Cohort that described student status in1982. Using the conventional flag for participation in the 1982 cohort sample would be insufficient and not wholly accurate, as that would include students who graduated early from high school in 1981, for example. By the opposite side of the same token, we found a number of students who were labeled "early graduates" and thus candidates for exclusion from a 12th grade flag whose high school graduation date was listed as 1982. These students were thus included in the population with SENRFLAG=1.

For all calculations of High School and Beyond/Sophomore Cohort data in *Principal Indicators*, SENRFLAG=1, and the appropriate PSE weight invoked.

The weights and flags for the NELS:88/2000 are more complex, still, because the cohort, established in the 8th grade, was "refreshed" twice: first, to be representative of the census of 10th graders in 1990, and second, to be representative of the census of 12th graders in 1992. The weights deriving from the 1992 12th grade refreshing are at the core of weights subsequently developed for the postsecondary transcript sample. The same three postsecondary weight types

developed for the High School & Beyond/Sophomores were employed here, but in combination with the 12th grade (2nd Follow-Up survey, or F2) weight and the student's presence in the final (2000) survey panel, F4. In addition, a set of weights based on the NELS high school transcripts in combination with the three postsecondary weight types was also developed to be invoked when questions of the relationship between secondary school variables derived from high school transcripts and postsecondary variables derived from postsecondary transcripts are at issue.

The NELS:88/2000 weights used in *Principal Indicators* are:

F4F2P1WT	For all likely postsecondary participants who were 12th graders in 1992
*F4F2P2WT	For all known postsecondary participants who were 12th graders in 1992
F4F2P3WT	For all postsecondary participants with complete records who were 12th graders in 1992
F4F2H2PW	For all known postsecondary participants who were 12th graders in 1992 for whom high school transcript records are available (for example, in all cases where academic curriculum intensity quintile is used as an independent variable in tables 3.2 - 3.4)
F4F2H3PW	For all postsecondary participants with complete records who were 12th graders in 1992 for whom high school transcript records are available (for example, in table 5.6)
F4F2PNWT	For all students in the 1992, 1994, and 2000 panels, whether or not they were 12th graders in 1992 (this weight is used only when questions of postsecondary access for the entire cohort are at issue in tables 2.6-2.9)

* Most frequently used weight.

As in the case of the High School & Beyond/Sophomore cohort, a special flag was developed for 12th graders in 1992. The existing flag on the NELS:88/2000 files excluded over 300 students who, in fact, were awarded high school diplomas in the spring of 1992. These students are included in the flag, GRADE12A, used in *Principal Indicators*.

The weighted Ns for all samples used in a table are provided in the notes to the table. Even if the same weight and flag is used on two tables, the weighted Ns may differ slightly because missing values in a particular variable are excluded from the calculations.

.

APPENDIX D

Standard Errors for Selected Tables

[THIS PAGE IS INTENTIONALLY BLANK]

Table D-1. Standard errors for table 2.1: Highest degree earned by 12th graders in the three grade-cohort longitudinal studies who earned more than 10 postsecondary credits, by gender and race/ethnicity

	Percent of students whose highest degree was . . .								
	None	Certif	Associate	Bach-elor's	Bachelor's plus some Grad	Masters	First Prof/ Doct	At least Bachelor's	**Percent of total in cohort**
All:									
Class of 1972	0.59	0.28	0.37	0.60	0.22	0.27	0.21	0.62	
Class of 1982	0.86	0.49	0.49	0.77	0.41	0.35	0.21	0.93	
Class of 1992	1.02	0.53	0.56	0.93	0.46	0.35	0.14	1.12	
Men:									
Class of 1972	0.80	0.30	0.47	0.81	0.29	0.37	0.37	0.85	0.70
Class of 1982	1.20	0.65	0.63	1.16	0.57	0.46	0.37	1.33	0.83
Class of 1992	1.63	0.68	0.88	1.37	0.72	0.49	0.14	1.59	0.98
Women:									
Class of 1972	0.82	0.44	0.54	0.78	0.31	0.38	0.16	0.86	0.70
Class of 1982	1.33	0.72	0.71	0.98	0.56	0.47	0.25	1.17	0.83
Class of 1992	1.20	0.77	0.76	1.17	0.61	0.57	0.15	1.36	0.98
White:									
Class of 1972	0.62	0.30	0.39	0.63	0.24	0.29	0.23	0.67	0.55
Class of 1982	0.94	0.56	0.55	0.88	0.49	0.41	0.24	1.04	0.79
Class of 1992	1.05	0.61	0.63	1.02	0.53	0.45	0.17	1.18	1.28
African-American:									
Class of 1972	2.03	0.80	1.15	1.54	0.40	0.91	0.53	1,87	0.47
Class of 1982	2.11	1.37	1.24	1.55	0.66	0.60	0.43	1.83	0.64
Class of 1992	3.96	1.52	1.79	3.40	1.15	0.58	0.04	3.67	0.88
Latino:									
Class of 1972	2.58	1.52	1.82	2.11	1.28	0.71	0.59	2,43	0.28
Class of 1982	2.92	0.82	1.34	2.01	0.43	0.18	0.14	2.47	0.33
Class of 1992	3.44	1.53	1.98	1.85	1.88	0.56	0.05	2.78	0.88
Asian:									
Class of 1972	4.06	0.73	1.95	4.24	2.14	2.56	2.15	4.30	0.13
Class of 1982	3.32	1.35	1.72	3.12	1.51	1.60	2.79	3.31	0.19
Class of 1992	3.72	1.68	3.47	3.50	1.44	0.69	2.50	4.11	0.15

SOURCES: National Center for Education Statistics**:** National Longitudinal Study of the High School Class of 1972, High School & Beyond/Sophomore Cohort (NCES 2000-194), and NELS:88/2000 (NCES 2003-402)**.**

Table D-2. Standard errors for table 2.2: Highest degree earned by 12th graders in the three grade-cohort longitudinal studies who earned more than 10 postsecondary credits and any credits from a 4-year college, by gender and race/ethnicity

	Percent of students whose highest degree was . . .								
	None	Certif	Associate	Bach-elor's	Bachelor's plus some Grad	Masters	First Prof/ Doct	At least Bachelor's	**Percent of total in cohort**
All:									
Class of 1972	0.62	0.14	0.27	0.67	0.30	0.36	0.29	0.66	
Class of 1982	0.94	0.25	0.56	0.93	0.58	0.49	0.31	1.00	
Class of 1992	0.94	0.40	0.55	1.01	0.61	0.47	0.26	1.08	
Men:									
Class of 1972	0.88	0.14	0.36	0.95	0.39	0.49	0.49	0.90	0.83
Class of 1982	1.26	0.33	0.61	1.37	0.80	0.64	0.52	1.36	0.99
Class of 1992	1.58	0.40	0.78	1.55	0.95	0.66	0.26	1.65	1.06
Women:									
Class of 1972	0.90	0.26	0.42	0.95	0.44	0.53	0.23	0.95	0.83
Class of 1982	1.26	0.37	0.62	1.26	0.80	0.69	0.37	1.35	0.99
Class of 1992	1.04	0.66	0.77	1.34	0.80	0.63	0.40	1.32	1.06
White:									
Class of 1972	0.64	0.15	0.28	0.73	0.32	0.39	0.31	0.68	0.58
Class of 1982	0.99	0.29	0.51	1.05	0.67	0.56	0.34	1.07	0.79
Class of 1992	1.02	0.48	0.55	1.14	0.68	0.58	0.22	1.15	1.18
African-American:									
Class of 1972	2.63	0.47	1.18	2.16	0.59	1.29	0.77	2.52	0.50
Class of 1982	2.75	0.22	0.91	2.45	1.08	0.95	0.70	2.83	0.64
Class of 1992	3.71	1.51	1.46	4.09	1.67	0.85	0.28	4.04	0.86
Latino:									
Class of 1972	3.51	0.88	1.85	3.53	2.25	1.24	1.05	3.98	0.25
Class of 1982	3.78	1.30	2.43	3.86	1.32	0.83	1.09	4.11	0.34
Class of 1992	4.10	0.55	2.81	2.97	3.11	0.98	0.39	3.81	0.71
Asian:									
Class of 1972	3.24	0.44	1.64	5.00	2.71	3.26	2.64	3.53	0.18
Class of 1982	2.63	0.58	1.75	3.88	1.90	2.10	3.54	2.87	0.19
Class of 1992	4.06	0.17	4.11	4.16	1.75	0.84	2.99	4.80	0.54

SOURCES: National Center for Education Statistics: National Longitudinal Study of the High School Class of 1972, High School & Beyond/Sophomore Cohort (NCES 2000-194), and NELS:88/2000 (NCES 2003-402).

Table D-3. Standard errors for table 2.3: Time to bachelor's degree and average undergraduate credits earned by 12th graders in the three grade-cohort longitudinal studies, truncating all three samples at 8.5 years following the modal high school graduation date

	Time-to-degree			Average total undergraduate credits		
	Class of 1972	Class of 1982	Class of 1992	Class of 1972	Class of 1982	Class of 1992
All	.019	.026	.028	.355	.399	.440
Men	.027	.036	.043	.479	.568	.596
Women	.024	.033	.035	.483	.513	.629
White	.020	.028	.030	.368	.439	.481
African-American	.067	.088	.133	1.25	1.05	1.99
Latino	.170	.087	.139	2.83	1.88	1.95
Asian	.113	.094	.193	2.56	1.15	1.55
Selected Major:						
Business	.042	.047	.073	.697	.615	.740
Education	.037	.086	.084	.759	1.48	1.06
Engineering	.077	.080	.088	1.62	1.50	1.62
Humanities	.064	.083	.143	1.47	1.32	1.45
Arts	.069	.101	.141	1.56	1.73	1.49
Social sciences	.042	.071	.059	.597	1.02	.945
Life sciences	.055	.071	.061	1.17	1.54	1.22
Health sciences and services	.069	.081	.080	1.60	1.75	1.55
Physical sciences	.116	.165	.163	2.36	1.88	2.19

SOURCES: National Center for Education Statistics**:** National Longitudinal Study of the High School Class of 1972, High School & Beyond/Sophomore Cohort (NCES 2000-194), and NELS:88/2000 (NCES 2003-402)**.**

[THIS PAGE IS INTENTIONALLY BLANK]

GLOSSARY

Variables Used, in Order of First Appearance in the Tables

[THIS PAGE IS INTENTIONALLY BLANK]

GLOSSARY

Variables Used in *Principal Indicators*, in Order of First Appearance in the Tables

Most of the variables listed below are described in detail in the text accompanying the tables, and the reader is referred to the table indicated. Where further details or explanations are necessary, footnotes are added. Detailed descriptions of the construction of all variables can be found in the descriptive windows of the Electronic Code Books (ECBs) on the CDs for each of the data sets.

Description	**Variable Name/Data Sets**	**Tables**
Student's true first institution of attendance.[22]	REFINST in NELS, HS&B/So with 7 aggregate Carnegie types. TRIFA in NLS-72, with 3 values	1.1 Not Used
Student's true first term date of attendance: the first month of the first term at REFINST	REFDATE in NELS, TRUDATE in HS&B/So. PSBEG in NLS-72 only if after May of 1972	1.1
Census Division Location of Student's High School	PHSDIV in NELS and HS&B/So (9 Values)	1.2
Second Language Background[23]	LANGDOM in NELS NNSE in HS&B/So	1.2
Race/Ethnicity	RACE4 in NELS & HS&B/So NEWRACE in NLS-72	1.2
Socioeconomic Status Quintile	SESQUINT in NELS, HS&B/So and NLS-72. SES percentiles were generated from the Duncan SEI scale, then turned into quintiles, with the 81st-100th percentile set to high	1.3

[22] Excludes institutions attended prior to high school graduation, institutions attended in the summer between high school graduation and fall college entry (unless the student attended the same institution in both periods), and "false starts." A false start is a case where the student enrolls in a school but withdraws from/drops all courses during the first term of attendance only to turn up in another school at a later point in time with a credit accumulating record. The second school in this example is the "true" first institution of attendance.

[23] A student who, in the 10th grade, identified a language other than English spoken at home as his/her native language, or in the 12th grade identified a language other than English spoken at home as the language with which he/she communicated with the mother in the household all or most of the time, was flagged as non-English dominant.

Pattern of State Residence at Three Points in Educational History[24]	STATEPAT in NELS	1.4
Highest Degree Earned	HDEG in NELS and NLS-72 NHDEG in HS&B/So (9 values)	1.4
Selectivity of 1st Institution of Attendance[25]	REFSELCT in NELS (5 values)	1.4
Number of Postsecondary Institutions[26] Attended as Undergraduate	TRANRCUG in NELS TRANREQ2 in HS&B/So NUMTRANS in NLS-72	1.5
Number of States in Which Student Attended as Undergraduate	STATEUG in NELS; NUMSTAT2 in HS&B/So	1.5 Not Used
Degree Earned from a School Other than the First Institution Attended	DIFFIPED in NELS DIFFICE in HS&B/So	1.5 Not Used
Degree Earned in a State Other Than the State of the First Institution Attended	DIFSTATE in NELS	1.5
Residence in 2000 in the Same State as the State in Which BA/BS was Awarded	STATBACH in NELS	1.6
Undergraduate Credits Earned at 4-Year Colleges	TCRED4YR in NELS CRD4YR in HS&B/So and NLS-72	2.2

[24]Permutation (4 values) of the state in which the student graduated from high school, the state of the student's true first institution of postsecondary attendance and the state in which the student was residing at the time of the 2000 computer-assisted telephone interview.

[25]Institutional selectivity in all three studies has five values: highly selective, selective, nonselective, open door, and not ratable. The first three of these values were based on the selectivity cells developed by the Cooperative Institutional Research Project (CIRP) at UCLA for its annual survey (since 1966) of entering freshmen. Community colleges and area vocational-technical institutes (AVTIs) were assigned the value for "open door." Theological seminaries, music conservatories, and sub-baccalaureate vocational schools were "not ratable."

[26]For both the High School & Beyond/Sophomore Cohort and the NELS:88/2000, this number includes "unrequested transcript schools," that is, schools the student did not indicate attending but from which transfer credits were recorded on other received transcripts.

Time to Bachelor's Degree (elapsed time from REFDATE to QUALDAT4 in NELS; from TRUDATE to DEGDAT4 in HS&B/So, and from PSBEG to DEGDAT5 in Class of 1972)[27]	BACHTIM2 in NELS BACHTIME in HS&B/So BATIME in NLS-72	2.3
Entered at Least One Postsecondary Institution[28]	ALLHDEG in NELS HSBSTAT in HS&B/So NLSSTAT in NLS-72	2.4
Macro Student Postsecondary History	STUHIST in NELS (9 values)	2.5
High School Graduation Date	PETSHSDT in NELS HSGRDAT2 in HS&B/So	2.7
High School Diploma Type	PETSGTYP in NELS	2.7
'Credit Attainment' Account of Student Accomplishment	CREDRET in NELS and HS&B/So	3.1
Had Children by Year of H.S. Graduation	CHLD1992 in NELS CHILD82 in HSB/So	3.2 Not used
Urbanicity of Student's High School (urban, suburban, rural)	PHSURBAN in NELS, HS&B/So, and NLS-72	3.2 Not used
Delay of Entry to Postsecondary Education Trichotomized[29]	DELAYTRI in NELS and HS&B/So	3.2

[27]In all three cohorts, students with incomplete undergraduate records are excluded, as are outlying cases where time-to-degree is calculated at less than 2.5 calendar years with a credit total that does not justify the calculation. For the NELS:88/2000 when there was a gap of more than 4 months between the last month of the term in which the student qualified for the degree and the date the degree was actually conferred, the qualifying month was used as the degree date.

[28]All three variables include students who did not enter a postsecondary institution, and these variables are thus used in estimates of "access."

[29]Distinguishes between students whose TRUDATE falls within 6 months of high school graduation, those for whom it falls between the 7th and 18th month following high school graduation, and those for whom it falls after the 18th month.

At Least One Received Transcript Contained Nothing but Remedial and GED-Level Work	GEDLVREC in NELS and HS&B/So	3.2 Not used
Continuity of Enrollment[30]	CONTIN in NELS and HS&B/So, 5 values in NELS, 4 in HS&B/So	3.2
In School Status in the Last Year of the Longitudinal Study[31]	INSCHOOL in NELS	3.2
High School Academic Curriculum Intensity Quintile[32]	ACCURHSQ in NELS and HS&B/So	3.2
High School Class Rank/GPA Quintile[33]	CLSSRNKQ in NELS and HS&B/So	3.2
Highest Mathematics Studied in High School	HIGHMATH in NELS and HS&B/So	3.2

[30]In all three cohorts, noncontinuous enrollment was defined as a stop-out period of two semesters (or their equivalent in quarters), either consecutively or as separate spells, summer terms not included. The NELS:88/2000 added a separate value in the variable for such stop-out periods that occurred after three academic years of continuous enrollment.

[31]The NELS:88/2000 version of this variable describes the level of education being pursued in the final year of the study: graduate degree, post-baccalaureate coursework, bachelor's degree, associate's degree, undergraduate vocational coursework, and undergraduate coursework of no particular description.

[32]The academic curriculum intensity variable starts with the highest observed level of curriculum across each of its major components (highest level of math, total Advanced Placement courses, total credits in English, foreign languages, core laboratory sciences, social sciences, computer science, mathematics), and setting the floor for that configuration at the first of what becomes a 32 (NELS) or 40 (HS&B/So) descending step variable that is then rendered in quintiles to smooth out otherwise occasional lumpy distributions. For the data in this volume, the variable was revised to reflect (a) a more accurate approximation of Advanced Placement coursework and (b) a small number of imputed transcript records based on the enhanced Advanced Placement account.

[33]In both cohorts, class rank percentile was computed only for those cases where (1) both class rank and class size were available, (2) where class size was greater than 10, and (3) where the student had received a standard high school diploma (not a GED). Where class rank was missing but a high school grade point average was available, an equipercentile concordance method was employed to generate a consolidated quintile scale. For the data in this volume, missing cases were imputed, by quintile, where the quintile values held by the student for both ACCURHSQ and SRTSQUIN were known and were identical.

Consistency and Level of Educational Expectations[34]	EDUANTIC in NELS EDUCEXP in HS&B/So	3.2 Not used
Credits Earned in 1st Calendar Year of Attendance	TCREDG in NELS TCREDE in HS&B/So	3.3 Not used
Credits in Courses from Which Student Withdrew	WITHCRED in NELS	3.3
Trend in GPA from 1st Year Through 2nd Year to Final Term[35]	GPATREND in NELS (3 reference points) GPATREND in HS&B/So (2 reference points)	3.3 Not used
Planned Enrollment for the Year After the End of the Longitudinal Study	PLAN2001 in NELS	3.3
Bachelor's Degree Likely to be Awarded within a Year After the End of the Longitudinal Study[36]	BALIKELY in NELS	3.3
Eligible for Associate's Degree, but no Degree Awarded[37]	ASSOELIG in NELS	3.3
System Retention from 1st to 2nd Year of Postsecondary Education	RETENTWO in NELS	3.4

[34]In both cohorts, students were asked a series of questions in grades 10 and 12 about the highest level of education they expected to attain, their plans for the year following high school graduation, the postsecondary institutions to which they applied (in the High School & Beyond/Sophomore surveys there were other questions along similar lines). The highest level of the "anticipations" variable indicates consistency (in grades 10 and 12) in plans and expectations for a bachelor's (or higher) degree. The second level of the variable indicates that the student *raised* expectations to the bachelor's level between grades 10 and 12; the third level indicates a lowering of expectations for the bachelor's, and so forth.

[35]There are three overall undergraduate GPA measures in the NELS:88/2000: one after the first year of attendance (GPA1), one taken 2 years after REFDATE (GPA2), and a final undergraduate GPA. The GPATREND variable indicates whether the student's GPA was rising, falling, or stagnant over the three measures.

[36]Student was enrolled in 2000 with more than 90 earned credits, a GPA equal to or greater than 2.75, and a major indicated on the transcript that was backed up by 15 or more credits in the field.

[37]Student had earned more than 65 credits from a community college with a GPA equal to or greater than 2.5, and earned credits in regular English composition, and either earned credits in three of the following four areas: college-level mathematics, core level 1 laboratory science, humanities, and social sciences, or presented a distinct occupational curriculum with a minimum of 20 credits.

Combinations of Institutional Types Attended	INSTCOMB in NELS COMBINST in HS&B/So	4.2
Types of Transfer Between 2-year and 4-year Sectors of Postsecondary Education	ATRANSFR in NELS and HS&B/So	4.3
Credits Earned from Community Colleges	TCREDCCL in NELS CRD2YR in HS&B/So and NLS-72	4.4
Attendance Patterns Using the Community College as Reference Point[38]	A2YR in HS&B/So and NLS-72 ACOMCOLL in NELS	4.4
Awards of Bachelor's Degree by Special Mission Institutions[39]	SPEC4 in NELS STYPE4 in HS&B/So	4.5 Not Used
African-American Students' Attendance Patterns Using HBCUs as Reference Points	BLACKATT in NELS And HS&B/So	4.5 Not Used
Latino Students' Attendance Patterns Using HSIs as Reference Points	HISPATT in NELS	4.6
Heritage Language Study in College[40]	HERILANG in NELS	4.6

[38]To illustrate: the 10 patterns of attendance for the NELS:88/2000 employ REFINST, TCREDCCL, TCRED4YR, degrees and degree dates, and first and last term dates of attendance at community colleges and 4-year institutions. The combinations help sort students who started in a community college and merely attended a 4-year college at some time, and those who truly transferred to a 4-year college.

[39]Special mission institutions include Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), tribal colleges, women's colleges, and (added to the configuration for the NELS:88/2000) religious mission institutions. Institutions can have more than one special mission.

[40]HERILANG flags students of Asian, Pacific Islander, Latino, or American Indian background who complete postsecondary coursework in the language of their heritage. Based on a hand-and-eye reading of transcript records of students with these backgrounds by two judges, the HERILANG flag was granted for (a) any student taking a course with "for native speakers" in the title, (b) any student completing two or more courses beyond the introductory level in a language matching their ethnic heritage, (c) any student completing introductory level courses with grades of 3.5 or higher, and (d) any student completing advanced courses in the language (conversation, composition, literature) with grades of 3.0 or higher. The reason for using grades is that they reduce some of the ambiguity in the relationship between ethnicity and language. A student of Asian background, for example, could take two elementary level courses in Japanese with grades of B- and one advanced course in "Conversational Cantonese" with a grade of 4.0. It is the latter that says this student has taken a heritage language course.

Postsecondary Credits Earned in coursework Prior to High School Graduation[41]	TCREDD in NELS	4.7
Credits by Examination[42]	TCREDE in NELS TCREDX in HS&B/So	4.7 Not Used
Bachelor's Degree Major (Aggregate)	BAMJR in NELS and NLS-72 B2MJR in HS&B/So (12 values in all)	5.1
Bachelor's Degree Major (Detailed)	MAJCOD4 in NELS and HS&B/So; MAJCOD5 in NLS-72	5.3 Not Used
Associate's Degree Major (Aggregate)	AAMJR in NELS, HS&B/So, and NLS-72	5.4
Undergraduate Credits Earned in Level 1 Core Laboratory Science	SCI1CRED in NELS and HS&B/So	5.5
Undergraduate Credits Earned in All Foreign Language Courses	FLANCRD3 in NELS HS&B/So, and NLS-72	5.5
Undergraduate Credits Earned in Calculus and Advanced Math	MTHCRD3 in NELS, HS&B/So, and NLS-72	5.5
Undergraduate Credits Earned in Courses About Non-Western Cultures and Societies	NWCSCRD in NELS HS&B/So, and NLS-72	5.5
Undergraduate Credits Earned in Statistics	STATCRD in NELS, HS&B/So, and NLS-72	5.5
Undergraduate Credits Earned in Fine & Performing Arts	FPACRD in NELS, HS&B/So, and NLS-72	5.5

[41]Excludes credits earned by examination (e.g., Advanced Placement,) which are counted only if and when entered on a postsecondary transcript.

[42]Includes Advanced Placement, College-Level Examination Program (CLEP), and institutional examinations (only when credit toward a degree is awarded). Does not include basic skills examinations or state "rising junior" examinations for which no credit is awarded.

Undergraduate Credits Earned in History	HISTCRD in NELS HS&B/So, and NLS-72	5.5
Computer-Related Credits (undergrad)	CRELCRD in NELS and HS&B/So	5.5
Undergraduate Credits Earned in Writing Courses Beyond Freshman Composition	WRITECRD in NELS and HS&B/So	5.5
Undergraduate Credits Earned in Upper-Level Laboratory Science	SCI2CRD in NELS	5.7
Undergraduate Credits Earned in Ethics	ETHCRD	5.7
Undergraduate Credits Earned in College-Level Mathematics[43]	MTHCRD2	5.8
Letter-Equivalent Grades[44]	GRADE in NELS, CRSGRADN in HS&B/So, CRSGRADB in NLS-72	6.1
Undergraduate Grade Point Average	GPA in NELS, HS&B/So, and NLS-72	6.1
Number of Courses from Which the Student Withdrew or Which the Student Repeated	WRPTCRSE in NELS BADCOURS in HS&B/So	6.2 Not Used
Type and Intensity of Remedial Coursework in Postsecondary Education	REMPROB in NELS and HS&B/So	7.1

[43]College-level mathematics includes courses below the level of calculus and above the level of Algebra 2. Examples include finite mathematics, college algebra, and analytic geometry.

[44]Letter equivalent grades include (a) the standard A, B, C, D, and F (and its penalty equivalents U, NP [no pass, but only for credit-bearing courses] and WU [withdrew unsatisfactory]); (b) P (pass) or CR (credit); (c) W or WP (withdrew passing); and (d) NCR (no credit repeat). Excluded are NC (no credit, where the course itself carries no credits and is not a repeated course), NG (no grade), and AU (audit). See Appendix B instructions to data entry personnel in the matter of "the only grades we use."