Moving Into Town—and Moving On:

The Community College in the Lives of Traditional-age Students

U.S. Department of Education

Moving Into Town—and Moving On:

The Community College in the Lives of Traditional-age Students

Clifford Adelman
Senior Research Analyst
Policy, Research, and Evaluation Staff
Office of Vocational and Adult Education
U.S. Department of Education

U.S. Department of Education
Margaret Spellings
Secretary

Office of Vocational and Adult Education
Susan Sclafani
Assistant Secretary

February 2005

Adelman, C. 2005. *Moving Into Town—and Moving On: The Community College in the Lives of Traditional–age Students.* Washington, DC: U.S. Department of Education.

To order copies of this report,

write to: ED Pubs, Education Publications Center, U.S. Department of Education, P.O. Box 1398, Jessup, MD 20794-1398;

or **fax** your request to: (301) 470-1244;

or **e-mail** your request to: edpubs@inet.ed.gov;

or **call** in your request toll-free: 1-877-433-7827 (1-877-4-ED-PUBS). If 877 service is not yet available in your area, call 1-800-872-5327 (1-800-USA-LEARN). Those who use a telecommunications device for the deaf (TDD) or a teletypewriter (TTY) should call 1-877-576-7734;

or **order online** at: www.ed.gov/pubs/edpubs.html.

The Executive Summary of this report is also available on the Department's Web site at: www.ed.gov/rschstat/research/pubs/comcollege/index.htm.

On request, this publication is available in alternate formats, such as Braille, large print, audiotape, or computer diskette. For more information, please contact the Department's Alternative Format Center at (202) 260-9895 or (202) 205-8113.

Contents

[THIS PAGE IS INTENTIONALLY BLANK]

Tables

Page

II: Terms and Parameters

III: First Portrait: Students Who Started Their Postsecondary Careers in a Community College

Tables (continued)

Table Number **Page**

IV. Second Portrait: the Community College Residence Trichotomy

Tables (continued)

Table Number **Page**

V. The Third Portrait: Moving On—Community College "Graduates"

Tables (continued)

Table Number **Page**

VI. The 'Cooling Out'/Diversion Critique Revisited

Appendix C

Tables (continued)

Table Number **Page**

Appendix D

Appendix E

Appendix F

[THIS PAGE IS INTENTIONALLY BLANK]

Acknowledgments

Special thanks to the Association for Institutional Research, the American Association of Community Colleges, and the National Articulation and Transfer Network for providing the occasions on which the approaches, ideas, and hypotheses for this document could be tried out before further data analysis and writing began.

For review of the drafts of *Moving Into Town*, the author is deeply grateful to four anonymous external reviewers selected by the Office of Vocational and Adult Education, and to Trudy Bers of Oakton (IL) Community College, Kent Phillippe of the American Association of Community Colleges, Alberto Cabrera of the University of Wisconsin-Madison, Thomas Bailey of Teachers College Columbia University, Jon Oberg of the Institute for Education Sciences of the U.S. Department of Education, and most of all to Paul Knepper of the National Center for Education Statistics.

In the final stages of review and revision, the author is especially appreciative of the efforts and insights of C. Dennis Carroll of the National Center for Education Statistics, David Bergeron of the Office of Postsecondary Education, and Gregory Henschel of the Office of Vocational and Adult Education—all of the U.S. Department of Education. And for the final shape of this document, the author owes much to its editor, Katherine Devine, of the Department's Office of Public Affairs.

For both encouragement, support, and review, very special thanks are due to Joan Athen, Community College Liaison for the U.S. Department of Education, and Hans Meeder, Deputy Assistant Secretary of the Office of Vocational and Adult Education, where the Department's principal community college activities are housed.

[THIS PAGE IS INTENTIONALLY BLANK]

Executive Summary

Moving Into Town—and Moving On: The Community College in the Lives of Traditional-age Students, offers a series of transcript-based portraits of traditional-age community college students. As of 2001, students under the age of 22 constituted 42 percent of all credit-seeking students in community colleges and those under the age of 24 constituted nearly three-fourths of first-time community college students (tables 1 and 2). As the baby-boom echo continues to play out with larger high school graduating classes, and as national and state policies focus even more intensely on the intersection between secondary and postsecondary education, this group is of increasing importance to community colleges. The three portraits offered here are designed to help community college administrators and faculty, along with state higher education officers, in developing responsive indicators of institutional performance. They may also prove useful to researchers in refining and refreshing the questions they ask and the variables they employ when exploring similar terrain.

To provide the portraits, this data essay draws principally on the most recently completed of the grade-cohort longitudinal studies of the National Center for Education Statistics (NCES): the National Education Longitudinal Study of 1988 (NELS:88/2000), which began with a national sample of 25,000 eighth-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 (representing a weighted 2.2 million students) were gathered in 2000, when most cohort members were 26 or 27 years old, and the story lines of *Moving Into Town* are built from the transcript records.

Three other NCES data sets are used to produce both comparative and trend data. Two of these are earlier grade-cohort longitudinal studies that also included college transcript data: the National Longitudinal Study of the High School Class of 1972 (NLS:72), for which postsecondary transcripts were gathered in 1984, when most of its students were 30 or 31 years old; and the High School and Beyond Longitudinal Study of 1980 high school sophomores (High School and Beyond/Sophomore Cohort), for which postsecondary transcripts were gathered in 1993, when most of its students were 29 or 30 years old.

More important is the Beginning Postsecondary Students Longitudinal Study of 1995–96, which followed its sample through 2001. The BPS96/01, as it is called, includes beginning students of all ages, and thus provides critical data justifying the focus of *Moving Into Town* on traditional-age students.

The Informing Analytical Metaphor of the "Town" and the Theme of Academic Process

This inquiry is guided by a strain in the literature of environmental design that approaches human settlements through the eyes and experience of people who use and move through them. It sees the community college as just such a human settlement, and for the convenience of narrative, calls it a “town,” the fundamental commerce of which is the delivery of learning in different districts (subject matter) by various means and schedules. Those who move into town to participate in its fundamental activity, students, establish residence of differing periods of time and intensity. Some are merely tourists; for others, this study uses metaphors of short-term visitors, longer-term tenants, and homeowners, each with a different type of stake in the time and place of the institution. These "settlement behaviors" have analogues in academic processes.

The analysis focuses on student *academic* history, not on social or psychological variables. It tracks what those who moved into town did (timing of move, extent of stay, academic activities and attainments before, during, and after the period of residence), but cannot provide full accounts of attitudes, beliefs, peer groups, mentoring or counseling, or social activities that may have played significant roles in the drama of their young adulthood. Academic history follows the student from high school (curriculum and performance) through postsecondary attendance patterns and attainment, with detailed data on postsecondary course-taking, to connections between postsecondary attainment, course-taking, and labor market experience. In so doing, it confronts the traditional censure of community colleges for "cooling-out" and "diverting" students from what the critics believe are more productive educational environments.

How Should Community College Students Be Described?

In order to provide those responsible for the administration and governance of community colleges with the most accurate information necessary for managing outreach, enrollments of different kinds, scheduling, advising, and other core and supportive services of the town's economy, it is necessary to draw clear boundaries around the student populations.

Age

First, and most important to understanding what community colleges do and how to judge what they do, is to divide their student population by age. The differences between backgrounds, family and job commitments, and consequent academic behavior and progress of traditional-age (18-24) students—particularly those who enter prior to age 21, as most of them do—and those who start out at later points in life are so different that mixing the age populations does considerable disservice to understanding. Representatives of community colleges, for example, cannot answer typical inquiries from feeder high school sophomores and juniors (such as questions about recommended credit loads) on the basis of institutional data that include those of their parents who are community college students.

Institutional Type

Second, the subject population attends public, two-year institutions in which the modal degree awarded is the associate degree. It does not attend other kinds of two-year institutions. Unfortunately, some research does not make this distinction. It is important because the traditional-age populations of community colleges are different from students in other two-year institutions in socioeconomic status, non-English dominant backgrounds, and delay of entry to postsecondary education.

Transfer

Third, in an era when nearly 60 percent of traditional-age undergraduates attend more than one institution, and in increasingly complex enrollment patterns, the meaning of "transfer" must be very taut. With students going back and forth between community colleges and four-year colleges, it is important to mark transfer as a permanent change of venue, a migration that is formally recognized by system rules. A transfer student in this data essay is one who (a) started in a community college, (b) earned more than 10 credits from the community college before (c) enrolling in a 4-year college and (d) earning more than 10 credits from the four-year college. The only time limit set for these changes of venue and credit accumulation is the length of the longitudinal study. In the case of the NELS:88/2000, that means 8.5 years from the modal high school graduation date of June 1992.

Putting these guidelines together, a statement typical of those that might be used to judge the success of community colleges would read:

> For 1992 12th-graders whose first postsecondary institution was a community college and who earned more than 10 credits from community colleges, 37 percent transferred to a four-year college by December 2000 (table 3). Of those who transferred, 60 percent had earned a bachelor's degree by December 2000 (not in table).

Education Expectations

Fourth, in trying to ascertain student goals, intentions, expectations, or aspirations, this study does not rely on one question asked in the senior year of high school or the first postsecondary registration line. Instead, a five-value variable built from answers to pairs of questions asked in the 10th grade and again in the 12th grade is employed. The variable describes the *consistency* of the student's vision of his or her ultimate *level* of education. Two years after the modal high school graduation date for the class of 1992, the question was asked again. What do we observe of this sequence for students who started out in community colleges?

- The most intriguing secondary school group consists of those who raised their education expectations to the bachelor's level between grade 10 and grade 12, and of these "belated bachelors," slightly more than half started in community colleges (table 4).
- Thirty-eight percent of those who started in community colleges consistently expected to earn a bachelor's degree when they were in high school, but only 36 percent of this group had applied to a four-year college (table 5);
- Logistic analysis confirms the composite education expectations variable as most significant, along with secondary school academic performance, of the factors accounting for attendance at a four-year institution among those who started in community colleges (table 6).

- Two years after high school graduation, an additional 19 percent of those who started in community colleges raised their education expectations to the bachelor's level, while 7 percent lowered their expectations from the bachelor's level (table 41).
- But ultimately, in terms of association with transfer, associate degree attainment, and bachelor's degree attainment, the "expectations" variable fades in power (tables 32, 33, and 42).

Education expectations are important to monitor, but not in a simplistic fashion. They are by-products as much as antecedents of performance.

Major Topics and Illustrative Observations

Three portraits of community college students are presented, each of which represents a stage of relationship between the student and the "town" of the community college:

1) The point of immigration from secondary school, an event;
2) Residence history subsequent to immigration;
3) Attainment and its consequences—moving on.

Each portrait begins as an outline. The descriptive details are then filled in, and the details suggest the most meaningful dependent variables for testing in terms of frameworks for accountability and potential change in the design of the town's academic processes.

______________*The "Event" Portrait: Starting Out in a Community College*

The population of community college students is described at the moment of moving into town. Who are they? And what features of their precollegiate backgrounds help explain why they started out in a community college? Some highlights include:

Forty percent of traditional-age students who entered postsecondary education in the 1990s started out in community colleges, a slightly higher percentage than was the case in the 1970s (table 10).
For older beginning students, i.e., those starting out at age 24 or more, over 60 percent first enter community colleges (table 7). These older students are more likely to think of themselves as employees than students; over half have children; and they are far less likely to transfer anywhere in their undergraduate histories than traditional-age students (tables 8 and 9).
With the exception of Latinos, traditional-age minority students are no more likely to start out in community college than white students. This has been true for 30 years (table 10).
Over the 30-year period of the three national grade-cohort longitudinal studies, the community college share of entering traditional age students from the lowest socio-economic status quintile increased from 44 to 55 percent (table 10).

There are considerable regional variations in the proportion of traditional age students who start in community colleges—from 20 percent in the New England census division (down from 30 percent in the 1970s) to 60 percent in the Pacific census division (table 11).
While there has been a notable improvement in the mathematics preparation of entering postsecondary students since the 1980s, 44 percent of those who started in community colleges in the 1990s did not reach algebra 2 in high school, compared with 11 percent of those who entered four-year colleges (table 14).
The more oriented a 12th-grader was to majoring in an occupational field in college, the more likely the student was to start out in a community college (tables 15 and 16).
Neither gender nor race/ethnicity nor second-language background nor first-generation status ends up playing a statistically significant role in explaining who starts out in a community college, but SES (socioeconomic status, a composite variable built from family income, parents' highest level of education, and prestige rating of parents' occupations) does play such a role: the higher the SES quintile, the less likely the student will start in a community college (table 16).

Why are these—and allied—details of the portrait of students whose first institution of attendance was the community college noteworthy?

Foremost because they drive home the importance of community college relations with secondary schools. The extent to which cooperative and outreach programs can move more high school students to the level of algebra 2 and beyond in mathematics would signal a major change in academic momentum of the entering community college population. The extent to which creative concurrent and continuous enrollment programs can reduce the proportion of community college students who currently delay entry to postsecondary education following high school graduation should result in a more sustained involvement in the academic economy of the town. Traditional age students constitute the bulk of the potential transfer population, and if community colleges seek to improve transfer rates, they would be advised to start the paths in feeder secondary schools.

Second because the geo-demography of entering community college students highlights the fact that community college enrollment planning for traditional age students will vary in each of the nine census divisions. And in terms of core demographic factors, until the Latino initial enrollment patterns change, community colleges would be advised to be particularly innovative in outreach programs for this population.

Other Users of the Community College: "Temporary" and Reverse Transfers

The event portrait also accounts for the 26 percent of students from the high school class of 1992 who attended community colleges at any time through December 2000 but started out in other types of institutions (95 percent of them in four-year colleges). There are three major groups of these "temporary transfers," defined by attendance pattern.

1. "**Four-year drop-ins**" constitute 42 percent of those who started elsewhere but also attended community colleges. Eighty-two percent of the drop-ins earned 10 or fewer credits from community colleges (table 19). These are high achievers: 87 percent earned bachelor's degrees, a rate 20 percent higher than others who started in four-year institutions.
2. Twenty-eight percent of those who started elsewhere were 4-year college students engaged in alternating patterns of attendance with community colleges, sometimes called "**swirling.**" Fifty-two percent of this group earned 30 or more credits from community colleges (table 19). This is not such a high achieving group: 56 percent earned bachelor's degrees, a rate 10 percent below others who started in four-year institutions (table 19).
3. True **undergraduate reverse transfers** constitute another 25 percent of the universe of those who started elsewhere. This group is characterized by poor academic performance in terms of both grade point average (GPA) and credits earned at the four-year school (table 19); lower rates of continuous enrollment; and higher proportions of course withdrawals and repeats than those who started at community colleges (table 20), and a low rate of completion of associate degrees of 17 percent (not in table).

Undergraduate reverse transfers constituted 7 percent of the members of the class of 1992 who attended community colleges. Since they enter into the regular stream of enrollment management and become residents of the town, they are a group for whom the community college ultimately assumes responsibility. While it is difficult to determine exactly when they will arrive at the community college, it would be helpful if community colleges and "parent" feeder four-year institutions of reverse transfer students established joint monitoring and advising systems for potential reverse transfers at early stages of their college careers.

Finally, the event portrait marks all those who earned 10 or fewer credits at community colleges, and who hence are labeled as "incidental" community college students. Fifty-two percent of incidental students were based wholly in community colleges. Twenty-nine percent of this group carried records of course work that were overwhelmingly remedial, hence earned few credits that counted toward degrees, and another 45 percent of this group simply failed too many courses to accumulate more than 10 credits (table 21).

The reasons for including accounts of both temporary transfers and incidental community college students in the event portrait are as follows:

1. To exclude the temporary transfers from the universe for which the community college bears principal responsibility;
2. To provide a prism for evaluating the academic history and performance of those who move into town for a short period or periods of time; and
3. To remind the reader that the students who start in a community college do not represent the full range of students who attend community colleges during their undergraduate histories. The findings reflect the dynamics of multi-institutional attendance that became a prominent feature of undergraduate attendance patterns in the 1990s.

________________________*The "Residence History" Portrait*

The issues raised regarding temporary transfers and incidental users of the community college facilitate consideration of long-term residents, those for whom the community college played a dominant role in undergraduate careers. These students started in and earned 30 or more credits from community colleges, and constitute slightly more than half of the traditional-age students who set out in community colleges. They provide a substantial history, one that enables analysts to use course-taking behaviors along with long-term attendance patterns and attainment to arrive at indicators of community-college system success. These students tell us what the community college really does, and provide a stable reference point for programming, course offerings, staffing and facility utilization.

The first group are called "**Homeowners**." Not only do they earn more than 30 credits from community colleges, but 60 percent or more of all their credits came from community colleges. They have the deepest stake in the town. The second group, called "**Tenants**," differs from the first in that less than 60 percent of their credits came from community colleges. A third group of residents consists of those who started in and earned between 1-29 credits from community colleges. These are called "**Visitors**." The labels reflect relative commitment to residence in town.

The Homeowners constituted 37 percent of those who started in and earned any credits from community colleges; Tenants constituted 18 percent; and Visitors accounted for 45 percent (table 23).

The Tenant group presented stronger academic momentum coming forward from high school (including over a third who reached mathematics beyond the level of algebra 2), and had higher and more consistent education expectations than either Homeowners or Visitors (table 25). Ninety-two percent of the Tenants entered the community college directly from secondary school; 64 percent earned more than 20 credits in their first calendar year; and 43 percent completed course work in college-level mathematics in their first year. All these percentages are significantly higher than those for the other two groups of residents (tables 26 and 27). It is not surprising that nearly all (96 percent) of the Tenants transferred, and 77 percent ultimately earned bachelor's degrees (table 31).

In terms of course-taking during the first calendar year of attendance, the records of Tenants were equivalent to those of students who began in four-year colleges with the exception of the type of college-level mathematics studied (table 27).

The course-taking activities of the Homeowners group in the first year comes up "light" in both the sciences and college-level mathematics, thus reducing the odds of completing associate degrees in technical fields (table 27).

For 37 percent of the Homeowners group, the associate degree was the highest degree earned—versus 4 percent of the Tenant group (tables 30 and 31). Sixty-six percent of those associate degrees were in occupationally oriented fields (not in tables).

Two Markers of Attainment

Two markers of attainment emerge for traditional-age students who start in community colleges and earn more than 30 credits there: either (a) transfer or (b) earning a terminal associate degree from a community college. Both these outcomes are sector performance indicators responsive to core missions of community colleges, but the community college seems to do better with the first than the second. By emphasizing the terminal associate degree as outcome, and seeking to identify academic behaviors that both contribute to and undercut that outcome, some guidance for improving the credentialing function of community colleges emerges.

Two logistic models address each of the sector performance indicators.

- Taking the entire population of community college entrants into account, the logistic model indicates that the factors of academic history that facilitate **transfer** to a four-year college are credits in college-level mathematics in the first year, earning credits during summer terms (a proxy for intense persistence), continuous enrollment, and avoidance of no-penalty course withdrawals and repeats (table 32). No demographic factors play a role.
- Taking the entire population of community college entrants into account but excluding those who transferred to four-year colleges, the second logistic model addresses factors of academic history that are associated with completing a **terminal associate degree at the community college.** Three of those factors are the same as in the case of transfer: continuous enrollment, college-level math credits, and avoidance of no penalty withdrawals and repeats. But two other ingredients emerge: holding a campus job during the first two years of enrollment and earning a higher ratio of credits in occupational fields to all credits earned (table 33). One of the problems with the occupational credits ratio, though, is that there is a tipping point: when the ratio rises above 65 percent, degree completion rates fall (table C-12). Balancing the occupational degree programs of the Homeowners group with more arts and sciences course work is thus an appropriate interventionary advisement to improve associate degree completion rates.

The Community College "Graduates" Portrait

The third portrait of traditional-age community college students is focused on the movement from the educational institution we have called the town into the labor market. Its defining element is the highest level of credentials *earned from a community college*, and these are divided into occupationally oriented and academic categories. Also included in the analysis are students who did not earn credentials, rather sufficient credits in specific fields (including credits in the General Studies distribution) so that their community college records could be classified as occupational or academic. The students from the High School Class of 1992 were too young at the age of 25 or 26 at the point in their careers at which labor market status was recorded to use earnings as an outcome. Instead, the analysis examines (1) continuity of employment, and (2) congruence between course of study and occupation as potential markers of success under the workforce development mission of community colleges.

Excluding the core academic associate degrees in general arts and sciences, students who earned associate degrees in protective services (principally criminal justice) and business were more likely to transfer than those with associate degrees in technology and health occupations (table 36). Ultimately, when one seeks to connect educational histories to labor market histories, the content of credentials is a critical component of the assessment.

And credentials are more important than earned credit thresholds in labor market analysis. Credentials appear to make a difference in continuity of employment. Seventy-nine percent of those who earned occupational associate degrees, and 71 percent of those who earned academic associate degrees were employed full-time for at least two years in the 1997–99 period compared to 58 percent of those who earned more than 60 credits but no degree (table 37).

When “congruence” between course of study and occupation in early labor market history is examined, 61 percent of those who earned occupational associate degrees from community colleges were in jobs related to their major fields. No other category of community college "graduate" comes close to that percentage (table 38). This relationship is yet another argument for improving the associate degree completion rate in occupationally oriented fields, hence contributing to workforce development.

When the distribution of occupations for those who earned occupational associate degrees is set forth, it reveals the strong suits of the community college curricula in protective services, business support, computer-related, and medical licensure and support occupations (table 39). But one out of five of the occupational associate degree recipients was employed as a clerical worker at age 25 or 26 (table 39). Making sure that these students have stronger options for entering business support occupations when they move on from their residence in the community college town requires monitoring of their course portfolio so that it includes something that promotes the student’s marketability, for example, coursework in accounting information systems or public health.

If research on labor market outcomes uses only variables such as years of schooling or the fact of attending a community college, and glosses over not only credentials, but more importantly, the content of students’ course of study, it does not advance the evaluation of institutional mission. As an example of a more profitable analytic framework by which community colleges can judge how well they have prepared students for the labor market, the essay selects community college students from the High School Class of 1992 who were working in computer-related and technical occupations in 1999, and extracts from their transcript records the 35 courses that accounted for more than three-quarters of their credits (table 40). These students’ records show college level mathematics, two supportive clusters of course work in graphics or drafting and computer science or computer programming, and nearly 20 percent of credits earned in writing and communications skills. The community college had clearly provided these students with what they needed to assume roles as midlevel technicians.

This is the type of analysis necessary for community colleges to build empirical profiles of curricula likely to be congruent with current knowledge and skill practice in the labor market, and from those profiles, rearrange the pathways (curricular sequences), signs (advising), and transport (course scheduling) of the town to produce optimal results. It also argues once again for adjustments to the larger academic transport system that begins in secondary school.

Revisiting the 'Cooling Out'/Diversion Critique of Community Colleges

Recognizing that the populations attending community colleges have changed considerably since the 1960s and 1970s, when major critiques of the institutions as "diverting" promising students from four-year colleges and "cooling out" their aspirations were written, the essay underscores and elaborates three major factors of community college life that alter the conditions under which diversion can be judged:

- The community college does not serve secondary school students from the highest quintile of academic preparation, and policy in many states has driven more remediation into the town of the community college. Over 60 percent of traditional-age students entering community colleges from both the High School Class of 1982 and High School Class of 1992 wound up in at least one remedial course (table C-9).
- Students who start out in community colleges are not those with uniformly high education aspirations either, but, contrary to "cooling out" analyses, the experience of entering community college students over a two-year period has, on balance, a positive effect. As noted above, 19 percent of the 12th-graders from the High School Class of 1992 who first entered community colleges raised their education expectations to the bachelor's-degree level by the spring of 1994 compared with 7 percent who lowered their expectations from that level. There were no differences by race/ethnicity in this regard (table 41).
- The diversion we *do* witness among community college students from the High School Class of 1992 occurred *within* the history of students who were occupationally oriented. That diversion involved first-year course-taking, and missed opportunities for passing through "gateways" in English composition and college-level mathematics (table 27). If research ignores discrete curricular choices and their sequences, it may never identify the reasons that students fall away from the path to credentials.

Revisiting the cooling out and diversion critique requires a logistic account of bachelor's degree attainment of traditional-age students who start in community colleges. The multivariate analysis underscores variables noted previously (positive effects of earning summer term credits and number of credits earned in college mathematics, and the negative force of no-penalty withdrawal and repeat courses). But it also brings forward, although in subordinate and statistically weaker positions, the number of credits earned from community colleges themselves, and the critical momentum line of earning 20 or more credits in the first calendar year of enrollment (table 42).

Summary

Across the portraits and the various aspects of student academic history examined in this study, it is clear that there are six distinct traditional-age populations served by the community college:

1. A persistent group oriented toward traditional academic and occupational fields that establishes a path of attainment involving transfer and earning a bachelor's degree;
2. An equally persistent group oriented toward the intermediate occupational credentials awarded by community colleges that also establishes a path of attainment;
3. A group with significantly weaker secondary school preparation that struggles to acquire a modicum of credits in the community college, then stops;
4. A group that basically withdraws on entry to the community college, earning few if any credits;
5. Temporary visitors who are based in other types of institutions, principally four-year; and
6. A small population of undergraduate reverse transfers who evidence declining momentum toward credentials at any level.

In terms of what happens to each of these groups, think of a bookkeeper's ledger, with line items. In its accountability metrics, the community college is wholly responsible for the first three of these groups, and on a consolidated line. Inclusion of the fourth group on that line is problematic, as these students do not attain even the status of tourists in the town. The temporary visitors deserve a separate page in the ledger, since the community college should mark the course work provided for them (table C-3). Reverse transfers are the most difficult of these groups because they arrive in the town of the community college at unpredictable moments and with experiences of varying length and quality in the four-year sector.

These populations are derived from their histories, and if we think of them starting out as settlers in or immigrants to a town or city that already possesses form and function, what we observe is a range of accommodations to the environment. We judge accommodations successful when they result in attainments that allow individuals to move on to other education environments or to find harmony between education and economic activity. When attainment rates fall short, the elements of student academic history that play notable roles are highlighted for special attention. No, they don't play equally notable roles in all community colleges, but they provide a very practical map for those in a position to study, redesign and adjust local environments.

On Reading Tables in This Study

All tables in this data essay are constructed to meet the statistical standards for table presentation of the National Center for Education Statistics. They are stand alone tables, so that if they are reproduced outside the context of the essay, they tell a complete, self-contained story. To ensure a complete story, the tables in this document include the standard errors of the estimates. The reason for this election—instead of placing tables of standard errors in an appendix—is to enable the reader to judge, on the spot, whether the difference between any two estimates is statistically significant. The formula invoked in that judgment is the simple student's *t* test:

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

where P_1 and P_2 are the percentage estimates to be compared and se_1 and se_2 are the corresponding standard errors. If $t > 1.96$, one has a statistically significant difference at $p < .05$ (which means that the probability that this observation would occur by chance is less than 1 in 20), a standard marker.[1]

The judgment of statistical significance can often be determined without the aid of a calculator. For example, in table 29 on pages 78 and 79, the percentages of three groups of community college students who held a campus job at some time during their first two years in higher education are presented, with standard errors in parentheses.

Group A	Group B	Group C
12.6 (2.12)	10.6 (3.07)	7.8 (1.48)

With the student's *t* test in mind, it is easy to see that the difference between Group A and Group B is *not* statistically significant. That is, the difference of the estimates is 2 (12.6 - 10.6). Both of the standard errors are greater than that difference, so it is impossible for the formula to yield > 1.96. The same criterion tells the reader that there is no statistically significant difference between Group B and Group C because the difference of the estimates is 2.8 and one of the standard errors is larger than that . However, a calculator might be necessary to confirm that there is no statistically significant difference between Group A and Group C in this matter.

[1]For technical issues concerning standard errors, see Appendix B.

-I-
Background

Nature of This Document

This data essay presents different ways of describing the educational careers of traditional-age students who attend community colleges. The student portraits are like the layers of a map of the uses of a town or city by a generation of residents and visitors, those who come and shape the town's industrial, commercial, residential, and cultural districts—and then, move on. These portraits may prove helpful to community college administrators and faculty, along with state higher education officers, in designing responsive indicators of institutional and system performance. They may be beneficial to federal authorities in evaluating the role of the community college in the nation's postsecondary system. Finally**,** they also may be useful to researchers in refining and expanding the questions they ask and the variables they use in exploring similar terrain.

Relying on national data sets, the descriptions and analyses in this monograph may be considerably different from parallel data and constructs found in state system studies, and, certainly, in studies based on samples from individual institutions or small groups of institutions. Despite the national scope, the reader should not expect a comprehensive multifaceted study of community college students, with exhaustive and definitive treatments of the major topics that have consumed the literature on community colleges for a half-century—transfer, wage-rate differentials, remediation, and degree attainment. Most of these topics will appear in this account, but as part of the different portraits, and in supporting roles.

A considerable amount of data, with its requisite technical notation, is explored in the text. Some data are presented as reference material; some as food for analysis. Those readers interested in highly specialized data issues will find them in the appendices. The general reader will find convenient boxed summaries and commentary at the beginning of each major section. Reasonable assumptions about relationships are necessary to move through these data. To the extent to which this journey contributes to theories of the effects of community college experience, the reader will be directed to the substantial modification of the "cooling out" and "diversionary" hypotheses first advanced by Clark (1960) and described below**.**

Scaffolding of This Study: Settlements and Environmental Design

Four decades ago, Clark Kerr (1963) used the metaphors of town and village to contrast the forms and cultures of early (principally 19th century) four-year colleges with the city of the modern university. This analogy between universities and cities as complex systems or open systems continues to be elaborated in the literature (e.g., Frost, Chopp and Pozorski 2004), but principally in a language of bureaucracy, knowledge production, academic workforces, and contending social and economic environments. Student experience is not of primary concern.

This inquiry, in contrast, is guided by a strain in the literature of environmental design that approaches human settlements through the eyes and experience of people who use and move through them (Lynch 1960, 1976; Lynch et al. 1977; Halprin 1963; Halprin 1969; Jackson 1970; Chermayeff and Alexander 1965), so that the student moves to center stage. It posits the community college as a human settlement, and for convenience of narrative, calls it a “town.” Faculty, administrators, and support staff are considered part of the infrastructure of the settlement, along with buildings, utilities, transport, communication systems, and finance systems. The fundamental commerce of the town involves the delivery of course work in different districts (subject matter) by various means and schedules, and hence performs an economic role in the distribution of knowledge (Machlup 1980). From the perspective of this study, the supportive commerce includes academic advisement, assessment, and information systems. Those who come to the settlement to participate in its fundamental economic activity—the students who are our subjects—establish residence of differing periods of time and intensity. Some are merely tourists; others, as we will note, become longer-term visitors, tenants, and homeowners, each with a different type of stake in the time and place of the institution. These are what the city planner Kevin Lynch (1976) called "settlement behaviors," and we will mark their analogues in academic processes. It is proposed that this academic environmental perspective is a fresh and helpful way of understanding the histories of community college students.

Reviewers of the drafts of this document asked for a modest expansion of this conceptual scaffolding because it is not a common way of describing the relationship between institutions of higher education and their students. Consider this: what would you think about if, given a large plot of land, with all the variances in elements such as topographical features, access to roads, other transportation links, and utility systems, and you were asked to design a new town with (1) an economy that is both self-sustaining and linked to surrounding economies, and (2) an environment that encourages would-be residents to settle, engage successfully in the principal economy of the town, and develop and sustain a culture of the place. Match each element of physical and system design on your list—districts, streets, green space and open space such as parks, plazas, and squares, form and location of housing, nature and location of commercial space, signs and symbols, pedestrian movement, landmarks that serve for orientation, and communication systems—with an analogue in the academic process such as advising or course scheduling, or service processes such as those of registrars and bursars. A table of analogues will just scratch the surface of institutional complexity, and the way in which place comes alive as students move through its lights, stand at its bus stops, and run down its ramps. It is not a static place: it has “rhythmic structure,” and should generate “the maximum of interaction between people and their . . . surroundings” (Halprin 1963, p. 7).

If one thinks of students starting out as settlers in or immigrants to a town or city that already exists and possesses form and function, what one observes are a range of accommodations to the environment. Some of these accommodations are successful in the sense of attainments that allow individuals to move on to other environments or to find harmony between education and economic activity. At the same time, there is a reciprocal effect: Human activity reshapes community (Halprin 1969). In the case of the growing traditional-age population in community colleges, the features of student persistence and the tenor of course-taking advise the governing authorities of the town or city what services to offer, how to plan for differential enrollments, where to strengthen public utilities, where street signs and symbols need clarification, and how to change the traffic patterns. All of these steps are analogous to those recommended for "environmental improvement" by Lynch and his colleagues on the basis of interviewing adolescents in seven cities in four countries (Argentina, Australia, Mexico, and Poland) to ascertain how they viewed and used their physical environments (Lynch et al. 1977) and to determine what would make for more constructive engagement with education, economic life, play, and family.

So the metaphor of "moving into town—and moving on" is not chosen lightly. This essay follows the student, not the institution, under the conviction that what students do tells us where the institutional environment is functioning as intended. We have observed that some students are very successful at negotiating the paths and districts of the town, while others are uncertain of their objectives, and get lost—perhaps because the street signs were partially hidden or because what should have been a pedestrian ramp to a commercial district proved to be a barrier. In environmental improvement efforts, we would benefit from J.B. Jackson's notion of "the stranger's path," that is, a series of expectations in physical space from a point of arrival such as a railway station, through transitional zones, to economic activities that serve core human needs such as temporary food and lodging, and then more permanent employment and residence (Jackson 1970). If community colleges create a path that is clear and inviting, if every step in the academic process is highly imagible so that students know exactly where they are and can orient themselves to the next strategic junction (Lynch 1960), they will witness a higher proportion of long-term residents in their student populations, and a higher proportion of these who move on in convincingly measurable ways. Those students will be testimony to the success of the community college as an enabling academic environment.

Sequence of Portraits

The monograph will first defend the universe of traditional-age (18–24 years old, and entering higher education prior to their 21st birthday) students as the most appropriate population on which to focus in light of: (1) current and near-term future trends in community college attendance; and (2) national efforts to improve the preparation of secondary school students to enter higher education with sufficient academic momentum to carry them through to credentials. The defense will call on national grade-cohort longitudinal study data sets that are inevitably confined to traditional-age students, and set them against other data sets with national samples that include students who start higher education at later points in life.

Having drawn a frame around this study's universe, the virtues and limitations of three portraits, or ways of describing, community college populations will be demonstrated:

- The ***first institution*** portrait distinguishes between students who began their postsecondary careers in community colleges and those who started in other types of institutions, whether or not they attended a community college at any other time. This portrait is determined by an **event** analogous to moving in to a town or city. The question of whether one is truly committed to moving into that town or whether one sees it as a temporary initial residence in adult educational life is addressed, thus revisiting a long-standing research tradition that places considerable weight on the education aspirations of those who start out in community colleges. This portrait also sorts students in terms of their use of community colleges, focusing on *ad hoc* and incidental students to illustrate the differences between tourists who require accommodations and residents who seek housing (Chermayeff and Alexander 1965). This discussion will inevitably address the topic of the dynamics of multi-institutional attendance, the inter-sectoral and intra-sectoral "swirling" that became a prominent feature of undergraduate attendance patterns in the 1990s.

- The community college ***residence history*** confines the universe to community college attendees, views their completed chronicles of attendance, and characterizes those histories in terms of intensity of the community college role. This description concentrates on students for whom the community college played a dominant role in educational life, and who became major stakeholders in the settlement. It sets out the activities of long-term residents who are fluent in the town's districts, paths, and landmarks (Lynch 1960) and, as such, is the most important of the portraits in developing terms of institutional accountability.

- The community college ***attainment*** portrait references the type and tone (academic or occupational) of the highest credential earned in community colleges. This model modifies a classification scheme initially suggested by Grubb (1992, 1997), confines the universe to community college attendees, and characterizes their histories principally in terms of labor market outcomes, that is, what happens when town residents move on.

Within each of these descriptive models, the analysis will acknowledge previous research and take up key measures of community college student academic experience such as transfer and remediation. It will also employ some logistic analyses to demonstrate the relative strength of variables in accounts of appropriate outcomes within portraits, e.g., what contributes to initial attendance at a community college. As a "contribution to the explanation of relationships," this approach recognizes the virtues and limitations of logistic analysis (Cabrera 1994).[2] The monograph is more interested in establishing frameworks within which future multivariate analyses, including path models and event history analysis**,** can be pursued, and mapping a potentially constructive terrain on which local decisions on enrollment management, secondary school outreach programs, student academic advising, curriculum provision, and accountability metrics can be assessed. This is the territory of institutional research officers and those who use the work of institutional research at individual community colleges, central offices of community college districts, four-year colleges, and state higher education agencies. It is a practical territory, not a theoretical territory. And it is a territory for which metaphors drawn from community and urban planning and design are apt.

It is acknowledged that the "town" of the community college is composed of towns of different characteristics—urbanicity, size, ethnicity and SES[3] of dominant populations served, governance, state and local revenue support—that determine what is offered to students, when, by whom, and how. But in a national portrait, there are sufficient commonalities among the hundreds of institutions represented to justify the assumption of a generic place.

From the three portraits will ultimately emerge six populations of traditional-age community college students:

1. A persistent group oriented toward traditional academic and occupational fields that establishes a path of attainment involving transfer and earning a bachelor's degree;
2. An equally persistent group oriented toward the intermediate occupational credentials awarded by community colleges that also establishes a path of attainment;
3. A group with significantly weaker secondary school preparation that struggles to a modicum of credits in the community college, then stops;
4. A group that basically disappears on entry to the community college;
5. Temporary transfers who are based in other types of institutions, principally four-year; and
6) Undergraduate reverse transfers who, in the national data samples examined here, evidence declining momentum toward credentials.

The reader is advised at the outset not to confuse the portrait with the populations.

---

[2]Logistic regression using the Statistical Analysis System (SAS) is employed because all questions for which it is invoked in this document have dichotomous outcomes, e.g., did or did not start in a community college, did or did not transfer, did or did not earn an associate degree. Furthermore, the populations in the logistic models are acceptably large (the raw numbers in the sample range from 750 to 3,250), and the results are reported in ways to satisfy most of the recommendations set forth by Peng, So, Stage, and St. John (2002).

[3]Socioeconomic status, a composite variable in all NCES data sets, built from family income, highest level of parents' education, and prestige (the Duncan Socioeconomic Index scale) of parents' occupations. All SES data in this study are reported in quintiles.

Data Sources

The principal data source and vehicle for this investigation is the National Education Longitudinal Study of 1988, which began with a national sample of eighth-graders in 1988 and followed them through 2000.[4] The NELS:88/2000 cohort, as it is called in this document, was scheduled to graduate from secondary school in 1992, and hence is also referred to as the High School Class of 1992. This data base, the most recently completed of the grade-cohort longitudinal studies conducted by the National Center for Education Statistics, is particularly rich in data elements, including (a) student responses to survey questions at five points in time: eighth grade (1988), 10th grade (1990), 12th grade (1992), two years after the modal high school graduation date for the cohort (1994), and at the conclusion of the longitudinal study in 2000, when most of the participants were 26 or 27 years old, and most importantly, (b) high school and college transcripts. This recent history is offered not as a prediction of the future, rather as a reasonable guide for the present. No other national study of recent years includes college-transcript documented histories that can be linked to high-school transcript documented histories. This study deals only with the information on hand; what it cannot see it does not count.

Three other data sets are called upon for different types of comparisons. The first of these is the Beginning Postsecondary Students Longitudinal Study of 1995/6–2001 (labeled throughout as BPS:96/01). This is an "event-cohort" study that began with a national sample of students who entered postsecondary education for the first time during the academic year 1995–96, and followed them through surveys to 2001. There are no high school or postsecondary transcripts in the BPS:96/01, though there are self-reported accounts of high school course work for the 47 percent of the sample who took either the SAT or American College Test (ACT) examinations and filled out accompanying student information forms. The virtue of this data set in the context of this study is that its student universe is not confined to traditional-age students, and allows comparisons by age brackets.

The other two data sets used for comparative purposes are the National Longitudinal Study of the High School Class of 1972 (NLS-72) and the High School and Beyond/Sophomore Cohort (HS&B/So). Both of these grade-cohort data sets are parallel to the NELS:88/2000, but with key exceptions (see Appendix A). The NLS-72 began with a national sample of 12th-graders in the spring of 1972 and followed them to age 32 or 33 in 1986, with college transcripts collected in 1984. This cohort is referred to throughout as the High School Class of 1972. The High School and Beyond/Sophomore Cohort began with national sample of 10th-graders in 1980 and followed them through 1992 in surveys and to September 1993 on college transcripts. The cohort was scheduled to graduate from secondary school in 1982, and is referred to throughout as

---

[4] The specific data sources are the restricted Postsecondary Transcript File (NCES 2003-402), which included revisions of the NELS high school transcript files as well, and its recently issued (June 2004) Supplement, reflecting subsequent editing and containing new derived variables. These combined data sources are the most accurate version of the NELS:88/2000 available.

the High School Class of 1982. Both of these data sets are invoked for time series comparisons of comparable traditional-age populations with similar data elements (for technical issues, interested readers are referred to Appendix B).

Limitations and Qualifications

The general strength of the grade-cohort longitudinal studies lies in their unobtrusive data elements (Webb et al. 1966), derived principally from transcripts; and student academic histories derived from transcript data are the engines of this monograph. The general weakness of these longitudinal studies lies in their comparative lack of survey data elements that would allow assessment of academic and social integration in postsecondary settings (Tinto 1987), or degrees of satisfaction with experience at particular institutions (Bean 1980). There are still other important elements missing from the longitudinal studies that provide accounts of interaction with faculty outside of the classroom, classroom vitality, peer support networks, time spent preparing for class, use of technology, and other topics covered by the National Survey of Student Engagement (Kuh et al. 2001), and student self-assessment of intellectual growth and effort (e.g., Strauss and Volkwein 2002).

Even so, as Boughan (2000) points out, academic performance measures are more directly tied to institutional academic processes and the nature of its academic workforce than to the socio-psychological growth of a diverse body of students that has been documented in a substantial line of research (see, for example, Napoli and Wortman 1998; Bers and Smith 1991; Lee and Frank 1990; Moss and Young 1995; Allen 1999). Whatever their limitations, the data sources employed here enable us to identify the academic processes of the environment implicit in student academic history.

Put in terms of the informing scaffolding of this study, we can track the activities of those who moved into town, such as timing of move, extent of stay, academic activities and attainments before, during, and after the period of residence, but we cannot provide full accounts of non-academic behaviors and attitudes that may play significant roles in their histories. Just as neighborhoods have cognitive, utilitarian, and affective dimensions that we observe separately but rarely simultaneously (Keller 1972), so do students' lives in the towns of community colleges. We can describe the nature of residency but not "membership" (Tinto), and it is the nature of residency that community colleges report to document and defend their missions.

Bailey and Averianova (1999) succinctly articulated five basic missions of community colleges (though each community college pursues those missions with different emphases):

1. the "collegiate" or traditional academic mission oriented toward a general education associate degree or transfer to a four-year institution;
2. the "vocational" mission directed toward building a credentialed (or, at the least, schooled) workforce to contribute to state and local economic development;

3. the “remediation” mission in which the community college basically takes up the failures of the k-12 system (or, in the case of recent immigrants, the educational system of their country of origin) in preparing students for postsecondary academic and vocational work (if one cannot read at the 10th grade level or higher, one will not be able to read the automotive repair manuals, either, let alone the college algebra problem); this mission also includes the remediation of adults returning to higher education after a lapse of some years;
4. the “contract” mission under which the community college directly serves requests of local industries, both manufacturing and service, for training existing employees in discrete skills, hence keeping local economic development concurrent with the state of knowledge and practice; and
5. the “community service” function, which is defined in diverse ways according to local context, ranging from the provision of adult recreation activities to roles that are often performed by social service agencies, and cannot be described as either academic or vocational.

What distinguishes the histories we read in longitudinal studies of traditional-age students from the stories of the broader population served by community colleges is that the longitudinal data allow us to observe only the first three of these missions. As Jacobs pointed out in *The Economy of Cities* (1970), the degree to which residents of an urban environment participate in different aspects of its infrastructure and economy is conditioned by their age, and the age of students has a great deal to do with the way one views community college mission.

-II-
Terms and Parameters

Summary

This section defines the key parameters and terms used in this study. The summary is provided for the general reader.

1) The most important parameter confines the universe to traditional age (18–24) students, particularly those who enter postsecondary education by age 20. They are a growing plurality of credit-seeking students in community colleges, and behave in very different ways than students who enter community colleges at later points in life. To mix students of all ages in analyses would result in serious distortions of what community colleges do.

2) There is a difference between community colleges and the broader category of "two-year colleges," and corresponding differences between community college student populations and the populations attending other two-year colleges in socioeconomic status, second language backgrounds, and delay of entry to postsecondary education. This study is confined to community colleges and their students.

3) To determine a student's *true* first institution of attendance, the study excludes institutions attended while the student was still enrolled in high school, an institution attended during the summer following high school graduation when the institution attended in the fall term was different, and "false starts," that is, cases where the student withdrew from the apparent first institution during the first term of attendance but entered and earned credits at another institution at a later point in time. The term "first institution" means *true* first institution throughout this study.

4) Transfer is not mere attendance at a four-year college by a student who starts in a community college The definition of transfer used here means: the student (a) begins at a community college, (b) earns more than 10 credits that count toward a degree at the community college before (c) attending a four-year college and (d) subsequently earns more than 10 credits from four-year colleges. Transfer is a permanent change of location. The 10-credit criterion is not arbitrary; it is an adjusted semester's credit load; and is designed to mark a modicum of commitment and momentum.

5) This study does not define education "aspirations" on the basis of one question asked in the senior year of high school or on first entry to the community college. Rather, it uses a five-step education expectations variable built from matching pairs of questions asked in both the 10th grade and 12th grade. The underlying concept of this variable is *consistency of level* of expectation, and the most intriguing group of community college entrants in this regard are those who raised their expectations to the bachelor's level between grade 10 and grade 12. In a logistic regression in which attending a four-year college at any time is the dependent variable for students starting at community colleges, the education expectations variable is the strongest explanatory factor.

Before mapping the ways in which students move into and use the community college settlement, it is necessary to clarify both core terms and population parameters. The most basic of the population parameters comes first, for without it one only confounds analysis.

Dividing the Student Population for Analysis I: The Critical Factor of Age

One of the principal features of the historical account of community colleges is the age distribution of their students versus that of four-year colleges. The presentations of this phenomenon are usually dichotomous: older versus younger; nontraditional versus traditional. As invoked in the analytical literature, the label "nontraditional" means a great deal more than age (Guerin 1999). Better phrased: age is a coordinate characteristic of the markers of nontraditional, which include delayed enrollment, part-time status, full-time work, financial independence, dependents other than a spouse, single parenthood, and lack of a standard high school diploma.[5] No matter which one of these characteristics one chooses, a higher proportion of students bearing that characteristic is enrolled in a community college than in a four-year institution (Choy 2002). At the same time, though, three out of four undergraduates enrolled *anywhere* in 1999–2000 exhibited at least one of these characteristics (Choy 2002), and non-traditional seems to have become the new "tradition." This study thus does not use nontraditional as an analytic construct, rather draws on some of its markers as independent variables.

As for the border between older and younger, Choy and Premo (1995) and Horn and Berktold (1998), use age 24, principally because that is the age at which a student is considered independent under federal student financial aid regulations. No matter what age bracket above age 23 one chooses, a higher proportion of students in that bracket are enrolled in community colleges than in four-year colleges (see, for example, Horn, Peter and Rooney 2002, table 6, page 22).

But these data on age, drawn from the National Postsecondary Student Aid Studies (NPSAS) beg the question. They say that older students are more likely to be enrolled in a community college in the snapshot year of the survey. They tell us nothing about the distribution of enrolled students, by age, *within* the community college sector, nor whether that distribution is changing. They tell us nothing about the potential change in the economy of the town as a result of a shifting mix of intensities of effort that inevitably accompany age (Jacobs 1970).

With very few exceptions (e.g., McIntyre 1999) the literature has been steadfast in its oversight of the shift in age distribution of the credit-seeking population enrolled in community colleges in the 1990s. The noncredit population may be older (Brewer 1996), but no national census of this population exists. On the other hand, we have a number of measures of the credit population, and they reinforce the same story line. We have a complete census through the Integrated Postsecondary Education Data System (IPEDS), to which the numbers and basic demographic

[5] Older students are also more likely to make enrollment decisions based on labor market conditions, particularly unemployment rates in their areas of residence (Betts and McFarland 1996). With a higher proportion lacking a standard high school diploma, they are also more likely than traditional-age students to be enrolled in remedial courses once they arrive at the community college, a factor that distorts our assessment of remediation volume (Merisotis and Phipps 2000).

characteristics of enrolled students are reported to the U.S. Department of Education by community colleges themselves (table 1), and a national sample in the Beginning Postsecondary Students Longitudinal Study of 1995/96–2001 (table 2). The IPEDS age brackets do not exactly match those used in other data set reportings, but that doesn't render them any less instructive: they make it clear that the community college population has been getting younger. In the space of one decade, the median age of community college students enrolled for credit has dropped from 26.5 to 23.5.

Table 1. Change in the proportion of all community college students enrolled for credit who were under the age of 22, and the median age for all community college students enrolled for credit, 1991–2001

Year	Percent under age 22	Median age
2001	42	23.5
1997	39	24.0
1993	35	24.5
1991	32	26.5

NOTE: For both computations, the number of students whose age is unknown is removed from both numerator and denominator.
SOURCES: NCES, *Digest of Education Statistics, 2002* (table 176, p. 214); NCES, *Digest of Education Statistics, 1999* (table 179, p. 206); NCES, *Digest of Education Statistics, 1995* (table 171, p. 180); NCES, *Digest of Education Statistics, 1993* (table 172, p. 178).

As for the age distribution of all first time students in 1995–96 (table 2), roughly three out of four who started in a community college were under 24 years of age at the time, and roughly three out of five were 19 or younger. While the age distribution is decidedly older than that for beginning four-year college students, **the dominant and dependable beginning credit student in community colleges was of traditional-age.** And this distribution is likely to remain stable or tilt even younger through 2010, as the "baby boom echo" plays out in larger high school graduating classes (Bailey 2002; Blanco 2004).

Table 2. Enrollment distribution of beginning postsecondary students, by age brackets, in four types of institutions, 1995–1996

Type of institution	**Age as of 12/31/95**				**Percent of all**
	Under 20	20-23	24-29	30 or older	
Community college	58.2 (2.0)	15.7 (1.3)	10.6 (1.3)	15.5 (1.6)	**41.2 (1.1)**
Four-year college	87.6 (0.8)	7.6 (0.6)	1.9 (0.3)	3.0 (0.4)	**45.5 (1.2)**
Other two-year college	45.5 (4.6)	23.1 (2.4)	16.1 (2.8)	15.3 (2.5)	**4.4 (0.3)**
Less than two-year	28.0 (2.3)	22.1 (2.2)	18.2 (1.7)	31.7 (3.1)	**8.9 (0.7)**

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding.
SOURCE: NCES, Beginning Postsecondary Students Longitudinal Study, 1995/96-2001, Data Analysis System.

This study confines its analyses to traditional-age students, defined as those who aged together from the 12th grade in high school, when nearly all were less than 20 years old, through their mid-20s. In the High School Class of 1992, over 90 percent of those who entered postsecondary education did so prior to age 21. The characteristics of "older" students, described in the first portrait of community college students (the "event" model) below, are so radically different from those of traditional-age that mixing the populations in the same analysis does little but mask and muddle. Putting populations from different planets together hinders accurate identification of problems in participation and attainment, the twin objectives of both public policy and students themselves. Furthermore, when public policy and improvement efforts at the state and federal levels are so focused at the intersection of secondary and postsecondary education, the natural population of preference is of traditional-age.

Terms #1: Community College Versus Two-year College

As used in this monograph, a "community college" is a public institution in which the modal degree awarded is the associate. The category of "two-year college" is larger. In terms of the modified Carnegie Classification of Institutions of Higher Education used in coding NCES grade-cohort postsecondary transcript files,[6] two-year colleges also include (a) two-year, associate degree-granting branch campuses of four-year institutions, (b) two-year private not-for-profit associate degree-granting institutions, and (c) any for-profit institution at which the highest degree awarded is the associate.

The research literature is inconsistent in its labeling and presentation of students who attend these institutions, most often by reference to "two-year college students," when the population described is really that of community colleges. More seriously, some of the literature mixes together students who have attended community colleges with those who attended other two-year institutions as if the population was homogenous. It isn't. Of 1992 12th-graders who started in community colleges, 13.8 percent (s.e .= 1.41)[7] came from the lowest SES quintile versus 25.6 percent (s.e. = 4.20) of those who started in other two-year institutions; 11.9 percent (s.e .= 1.38) of those who started in community college were from non-English dominant backgrounds versus 7.6 percent (s.e. = 1.76) of students who began in other two-year colleges; and while 72.6 percent (s.e. = 1.56) of those who first entered community colleges did so within seven months of high school graduation, the comparable percentage for those who first entered other types of two-year institutions was 62.2 percent (s.e. = 3.91). These differences are not overwhelming, but they are significant enough to send up a warning flag. In comparing entering 1996 students at community colleges and private two-year colleges using the Cooperative Institutional Research Project fall

[6]An external panel of registrars and institutional research officers advised the coding of institutional type and Carnegie Classification starting with the NLS-72 postsecondary transcripts.

[7] The results of the Taylor series method of calculating standard errors of estimates (s.e.) are included throughout this document so that readers can judge the significance of any comparison asserted in the text by invoking the student's *t* formula set forth in Appendix B. The Taylor series s.e.'s were produced with AM Software, a creation of Jon Cohen and associates at the American Institutes for Research, under contract to NCES.

first-time students data, Laanan (2003) found significant differences between the two groups in distance from home to school, proportion living with parents versus a dormitory, and level of parents' education, thus supporting a strict partitioning of the two-year universe.

This study is about those who attend community colleges. When attendance at other types of two-year institutions is included, it is under the more generalized category of "other sub-baccalaureate." For the record, if we took all students from the High School Class of 1992 (the NELS:88/2000) who started out in sub-baccalaureate institutions of all kinds, 89 percent began in community colleges (see Appendix C, table C-1).

Terms #2: The "True" First Institution of Attendance

This study departs from others in the way in which it defines the first institution of attendance. For traditional-age students in the three national grade-cohort longitudinal studies, the evidence of the first institution of attendance was drawn from received transcript records. The earliest date on any record following the high school graduation date for the student was flagged as the *provisional* entry date to postsecondary education and the institution on whose transcript that date appeared was the *provisional* first institution of attendance. This judgment was then modified to determine the "true" first institution of attendance with the following rules: (1) if the first date of attendance fell in the summer term immediately following high school graduation and the institution attended in the fall term was different, then the institution of the fall term was the true first institution; (2) if the student withdrew from the provisional first institution during the first term of attendance with no earned credits and appeared and earned credits at another institution at a later point in time, the second institution was flagged as the true first institution.

Throughout this document "first institution" means *true* first institution as described above.

Terms #3: Transfer Versus "Attended Four-year"

Community college transfer cannot be assumed (as do Velez and Javalgi 1987, Surette 2001, and others) as a case in which a student who started out in a community college subsequently enrolled in a four-year college at any time. To define the phenomenon in that manner results in a serious distortion when the outcome under examination is bachelor's degree attainment. Transfer is a change of venue, a sequential movement from a *de jure* status in one institution to a *de jure* status at a second institution. Put another way, it is a migration that is formally recognized by system rules. Transfer is more than a short visit, and to identify the phenomenon requires longitudinal studies. The substantial literature on calculation of transfer rates, whether classical vertical transfer (Grubb 1991; Cohen 1994; Spicer and Armstrong 1996) or transfer compounded by alternating enrollments and other multi-institutional patterns (Laanan and Sanchez 1996; Townshend 2002; McCormick 2003) assumes a measurable exposure to both community college and four-year environments, and a substantial sequential residence in a four-year institution that, at some point, becomes permanent (McCormick 2003).

The definition of transfer used in this monograph has been built into the transcript-based variables of both the High School and Beyond/Sophomore Cohort (High School Class of 1982) and NELS:88/2000 (High School Class of 1992) data sets:

> The student (a) begins postsecondary study at a community college, (b) earns more than 10 additive credits[8] from community colleges before attending a four-year college, and (c) subsequently earns more than10 additive credits from four-year colleges.

The "more than 10 additive credits" criterion is not arbitrary,[9] and allows for non-linear attendance behavior before and after transfer. That is, the student can alternate attendance between the community college sector and the four-year sector, and can attend more than one community college or four-year college along the way, as long as the more-than-10-credits threshold[10] is met within each sector. The student can follow an emerging norm of attendance involving multiple institutions, simultaneous and alternating enrollments known as "swirling" (de los Santos and Wright 1990; Borden 2004), and attendance patterns that can be described as "migration," "fragmentation," and "discovery" (Adelman 2003), and still be a transfer student. Furthermore, we cannot assume that students move from one neighborhood to another within the same town (intrasectoral transfer) or from one town to another (intersectoral) only for education and career goals. Discussions with students reveal other factors, including romantic involvements, desire to live away from home, desire to be with friends, and poor academic performance (Secolsky and Nazzaro 2001). Whatever the reason, we mark the fact that a transfer has occurred.

In an age of complex multi-institutional attendance patterns, asking whether a transfer from one type of institution to another took place within any specific period of time may be deceiving in cases of alternating attendance and the difficulty, under such circumstances, of determining precisely when the student called the second institution in the sequence "home." For this reason,

---

[8]Additive credits are those that count toward degrees.

[9]The more-than-10 criterion is a heuristic for an empirical adjusted semester's worth of earned additive credits. We use bachelor's degree recipients to set the model because we know they earned at least 120 credits and offer a full undergraduate history. For the High School Class of 1992 (the NELS:88/2000) the average credit load per semester for bachelor's degree recipients was 14.2 (average annual load of 30.8 minus summer term credits and credits by examination and dual enrollment / 2). From this figure is subtracted the average number of credits per semester from which the same students withdrew (2.0), the average number of credits per semester not earned because students received penalty grades (0.5), and an estimate of the average number of credits not earned because the courses in question were no-credit repeats (0.6) and incompletes (0.4) . Subtract the total (3.5 credits) from 14.2, and the empirical adjusted semester's worth of earned credits is 10.7. For the sake of convenience in programming, the heuristic of more than 10 is employed. Using the same methodology, the result was roughly the same for the class of 1982 (High School and Beyond/Sophomore Cohort).

[10]Cohen (1994) and others have used 12 or more semester credits as the threshold for additive credits earned in community colleges on the grounds that 12 marks the minimum number of credits to be considered a full-time student in a given semester. In the NCES longitudinal studies transcript files, all credits are converted to semester-hour equivalents.

and in contrast to both Grubb (1991) and Cohen (1994) who set an upper temporal boundary of four years from date of entry within which to judge transfer, this study uses the closing date of the longitudinal transcript file, no matter how many years that produces. In the case of the history of the High School Class of 1992, the full 8.5 year period of the transcript portion of the study (from the modal high school graduation date in June 1992 through the termination of postsecondary transcript data in December 2000) was marked for the identification of transfer behavior. This marker will produce a higher rate of transfer than a calculation ending with a four-year mark. The 8.5 year period is more faithful to student behavior.

Other cases of community college students earning credits in the four-year sector, even those who basically "touch base" with the community college via two or three courses and then move directly and permanently to a four-year institution, are not genuine transfers. Table 3 illustrates the difference between the transfer and four-year attendance universes for 12th-graders from the high school classes of 1972, 1982, and 1992, using the full length of each longitudinal study as its temporal map.

Table 3. Transfer and four-year attendance 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)
Of all students whose first institution of attendance was a community college:			
Attended a four-year	28.5 (0.79)	28.9 (1.12)	36.5 (1.65)
Transferred to a four-year	21.4 (0.70)	20.8 (1.06)	28.1 (1.57)
Of all students whose first institution of attendance was a community college **and** earned more than 10 credits from community colleges:			
Attended a four-year	31.5 (0.89)	34.6 (1.40)	44.0 (1.95)
Transferred to a four-year	28.1 (0.37)	26.9 (1.32)	37.2 (1.91)

NOTE: Standard errors are in parentheses.
SOURCES: National Center for Education Statistics: National Longitudinal Study of the High School Class of 1972 (unnumbered CD, 1992), High School and Beyond/Sophomore Cohort Postsecondary Transcript Files (NCES 2000-194), and NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

With an 8.5 year frame (compared to 11 and 12 year frames for the earlier longitudinal studies), the High School Class of 1992 evidenced both higher rates of attending four-year colleges and higher rates of transfer than its predecessors. This trend testifies to the increasingly complex dynamics of undergraduate behavior, though it also may indicate improvement in system efficiencies and the attention paid to transfer and articulation agreements by public institutions, in particular.

Dividing the Student Population for Analysis II: Student"Aspirations," Goals, and Expectations[11]

A persistent strain in the literature on community college students emphasizes stated education goals on entry to college (in both the national Beginning Postsecondary Students longitudinal studies and hundreds of institutional studies) or as seniors in high school (in the national grade-cohort longitudinal studies). Despite empirical evidence of distortion (Tubbs 1993), this strain usually relies on the student's answer to a single question asked at the outset of the study, and community colleges are blamed when students do not meet the goal they state (Karabel 1986) even when, as Rosenbaum (1998) and Conklin (1996) point out, the students' high school preparation is far below the norm expected of degree completers. The timing of the question, too, renders responses problematic (Palmer 1987), as statements at such moments tend to be socially desirable (Hays, Hayashi, and Stewart 1989).

When we award an affective expression a prominent role in analyses of education history, it behooves us to define it in ways that minimize threats to its validity. Contrary to the vocabulary of some analysts, we are not talking about "aspirations," a term which carries emotive overtones. The NCES grade-cohort studies asked an "aspirations" question only once, in the Base Year (1972) survey of the High School Class of 1972:

> What is the highest level of education you would like to attain?

In subsequent longitudinal studies, the question became:

> As things stand now, how far in school do you think you will get?

This is not an "aspirations" question: it is bounded. It is more properly called an "expectations" question**,** or, as Leigh and Gill (2003) contend, captures "a different dimension of aspirations." For the 12th-graders in the High School Class of 1972, the "aspirations" question was followed by a question intended to balance any irrational exuberance, "What is the highest level of education you *plan* to attain [italics mine]?" The difference (if any) between aspirations and plans could then be used in subsequent analyses in relationship to actual entry into postsecondary

[11]The author's more elaborate treatment of this issue, including some of the same tables, will be published under the title, "The Educational 'Anticipations' of Traditional-age Community College Students," in the *Journal of Applied Research in the Community College***,** in 2005.

education, in persistence, and completion, or in assessment of the academic behaviors and values of population subgroups.

The other grade-cohort longitudinal studies offer a more compelling way of assessing student goals in higher education, namely through pairs of questions asked in grade 10 and grade 12 that yield a more accurate measure of "goal commitment" (Allen and Nora 1995). The analytical objective in configuring the responses to these questions is to determine the *consistency* of the student's education expectations. Adelman (1999) constructed an "anticipations" variable from the High School and Beyond/Sophomore Cohort (class of 1982) surveys that distinguished the following levels of expectations:

> Bachelor's consistent in both grade 10 and 12
> Raised to bachelor's between grade 10 and grade 12
> Associate consistent or lowered from bachelor's between grades 10 and 12
> Lowered to no degree or inconsistent associate degree in grades 10 and 12
> Expected no degree or never indicated an expectation

The topics of the several pairs of questions asked in grade 10 and grade 12 were highest level of education expected, principal activity planned for the year following high school, planned timing of entry to postsecondary education, choice of two-year or four-year college as first institution, lowest level of education with which the student would be satisfied, and whether the student would be disappointed if he or she were not a college graduate. Students who evidence inconsistent anticipations for a bachelor's degree, for example, are those who indicated a bachelor's degree expectation in grade 10 and responded "don't know" in grade 12, said they would attend a two-year college after high school in grade 10 and a four-year college in grade 12 yet would be satisfied with an associate degree in grade 12.

The NELS:88/2000 (class of 1992) surveys asked slightly different questions in grades 10 and 12, with minor changes in the values of responses, but nonetheless allowed the construction of a five-value variable roughly parallel to that developed for the High School and Beyond/ Sophomore Cohort:

> Bachelor's consistent in both grade 10 and 12
> Raised to bachelor's between grade 10 and 12
> Inconsistent or lowered from bachelor's to "some college" between grade10 and 12
> "Some college" consistent or raised to 'some college' between grade 10 and 12
> Consistent sub-baccalaureate or no college plans

Now, how do we judge the putative education expectations of entering community college students? How do we judge what students tell us when they move into town about how long they plan to stay, where they plan to go next, and hence help us estimate the nature of their interactions with the economy of the town between entry and departure? In the case of the

NELS:88/2000, and using the five-value consistency x level configuration above, tables 4 and 5 set forth some parameters for estimating the proportion of students who entered community colleges who truly intended to earn a bachelor's degree. These data should diminish some of the ambiguity and noise surrounding traditional uses of the term "degree aspirations."

The first step in determining how our revised measure of anticipations plays out in student careers is to take into account all 1992 12th-graders who entered the postsecondary system at any time through 2000 and consider, by level of education expectations, what kind of institution they first entered (table 4). It is obvious that students who consistently expected to earn a bachelor's degree started overwhelmingly in four-year institutions, while the vast majority of those who lowered their expectations from the bachelor's degree along with those who had lesser education expectations to begin with started out in community colleges.

The anticipations grouping in table 4 that deserves most attention consists of the 18.5 percent who raised their goals to a bachelor's degree between grade 10 and grade 12: they are divided, with a slight majority starting in a community college. No matter where these "belated bachelors" started out in higher education, though, their subsequent academic histories were weaker than those who consistently anticipated earning the baccalaureate or higher while they were still in high school. For an illustration of this phenomenon not in the table, of those belated bachelors who started in four-year colleges, 52 percent (s.e. = 2.86) earned the bachelor's degree by December 2000 compared with 76 percent (s.e. = 1.16) of those who consistently anticipated a bachelor's or higher degree while in high school.

Table 4. Percent of 1992 12th-graders who first entered three types of postsecondary institutions, by consistency of level of education expectations

	Type of institution first attended			
Consistency of level of education expectations	Four year	Community college	Other sub-baccalaureate	**Percent of all in group**
Bachelor's consistent	73.4 (1.22)	25.2 (1.21)	1.5 (0.27)	**59.7 (1.03)**
Raised to bachelor's	44.4 (2.05)	51.1 (2.10)	4.6 (0.78)	**18.5 (0.71)**
Inconsistent or lowered	18.1 (1.76)	69.3 (2.29)	12.6 (1.72)	**13.1 (0.69)**
'Some college'	17.7 (4.08)	69.4 (4.25)	12.9 (2.38)	**6.1 (0.53)**
Sub-baccalaureate or no college plans	10.6 (2.30)	68.5 (4.05)	20.9 (3.36)	**2.7 (0.26)**

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding. Weighted N = 1.97M.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

This telling statistic raises the question of how much of a difference it makes if the measure of a student's education expectations is taken on the basis of a single question asked in the spring of the senior year of high school versus a composite judgment of consistency of vision and behavior in grades 10 and 12. Among 1992 12th-graders who first entered community colleges, 60.3 percent (s.e. = 2.09) of those who indicated in grade 12 that they expected to earn a bachelor's or higher degree evidenced consistent goal commitment in grades 10 and 12. Among those who first entered four-year colleges, the proportion with a consistent bachelor's degree expectation was 70.6 percent (s.e. = 2.10). If we are going to move forward with confidence in the measure invoking a single question as the source of judgment, we need to be closer to a 100 percent consistency rating; 60 and 70 percent do not qualify**.** These proportions argue for the more conservative consistency-by-level variable as the preferred measure of anticipations on entry to community colleges in particular. But we need another piece of information before we test the construct in a multivariate context: did those who first entered community colleges and said they expected to earn a bachelor's degree or higher apply to a four-year college before graduating from high school?

Table 5 isolates those whose first institution of attendance was a community college, displays the distribution of the population by education expectations and, for each level of expectation, indicates the proportion who had applied to a four-year college. The reader will note that approximately 62 percent expected to earn a bachelor's degree at some time, but of this group, only about 30 percent had applied to a four-year college prior to high school graduation. While not shown in table 5, of that 30 percent who applied to a four-year college, only 26 percent (s.e. = 4.94) were in the top 2 quintiles of high school Academic Resources (a combination index of curriculum, class rank/grade point average, and senior year score on a 90-minute enhanced version of the SAT).[12] In terms of the behaviors that reinforce goal commitment, these are not convincing percentages.

Table 5. Among 1992 12th-graders whose first institution of attendance was a community college, distribution by consistency of level of education expectations, and percent who had applied to a four-year college by grade 12

Education expectation	Consistency of level of education expectations	Percent who had applied to a four-year college by grade 12
Bachelor's consistent	38.0 (1.62)	35.6 (2.75)
Raised to bachelor's	23.8 (1.35)	23.7 (3.26)
Inconsistent or lowered	22.9 (1.44)	12.3 (2.19)
"Some college"	10.7 (1.04)	2.6 (0.84)
Sub-baccalaureate or no college plans	4.6 (0.61)	4.7 (1.72)
All 1992 12th-graders who entered community colleges	100.0%	21.8 (1.48)

NOTE: Standard errors are in parentheses**.**
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

[12]Comparable figures and commentary for students who started in four-year colleges are presented in Appendix C, table C-2).

From these precollegiate preliminaries, then, it does not appear that education expectations even as refined in terms of consistency of level play as significant a role in the attainment profiles of students who begin in community college as the literature claims **(**Allen 1999; Bers and Smith 1991; Laanan 2003; Napoli and Wortman 1998**).** This hypothesis can be tested in a number of logistic regression models (Adelman forthcoming 2005), of which the following is illustrative. This logistic (table 6) asks of all students from the High School Class of 1992 what factors contributed to their *ever* attending a four-year college. "Ever attending," as noted above, is not to be confused with "transfer," but certainly is a necessary step toward confirming intentions.

The independent variables in the this equation are:

Academic Resources quintile (5 levels)
Socioeconomic status quintile (5 levels)
Race (African-American, Latino, or American Indian = 1)
Education expectations (3 levels by consistency)
Applied to a four-year college (yes = 1)
Entered postsecondary education within seven months of high school graduation (yes = 1)
Became a parent by age 20 (yes = 1)

Two of these variables require some elaboration. "Academic Resources" is a composite index of three measures: academic intensity of high school curriculum,[13] class rank/GPA,[14] and senior year test score.[15] The weights of these components within the index are curriculum: 42 percent; class rank/GPA: 33 percent; and test score: 25 percent.[16]

---

[13]The high school academic curriculum intensity variable is constructed from highest level of mathematics studied, number of advanced placement courses, Carnegie Units measuring class time spent in English, mathematics, core laboratory science, all sciences, foreign languages, social studies including history, and computer science, and the number of remedial courses in English/reading and mathematics. For the class of 1992, there were 31 levels of academic intensity involving these combinations. Weighted quintiles mitigate the lumpy distribution.

[14]Class rank (for the NELS:88/2000 students who attended high schools with more than 10 students in a graduating class) was set in percentiles, and matched against the distribution of high school GPA, also 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.

[15]Derived from an equipercentile concordance of composite scores on a special test of general learned abilities administered to the NELS:88 students in the 12th grade and included in the NELS second follow-up file (1992), and equated SAT/ACT scores (included on the 1992 NELS high school transcript file and, where these were missing and available on postsecondary transcripts, from the NELS: 88/2000 Postsecondary Transcript file) in cases where the students had not taken the special test. The percentile scale that resulted was then rendered in quintiles.

[16]The weights are determined by the ratios of parameter estimates in a logistic regression with bachelor's degree completion as the dependent variable, and for a universe including all 1992 12th-graders who participated in the NELS:88/2000 second, third, and fourth follow-up panels. Quintile standings for each of the three components were first summed for each student, then weighted, then strung out on a percentile scale which was then rendered in quintiles. While it is possible that the effects of the three components change over time, hence, should be considered separately (DesJardins, McCall, Ahlburg, and Moye 2002), the event described by the dependent variable at issue here, attending a four-year college, unlike earning a bachelor's degree, has no standard temporal reference point.

The education expectations variable also requires a special note. Unlike the quintile variables in which meanings are linear, the five-level expectations variable is categorical. For purposes of multivariate analysis, the five levels were reduced to three as follows: (1) consistently expected to earn a bachelor's degree; (2) raised expectations to the bachelor's degree between grades 10 and 12; and (3) either lowered expectations from the bachelor's level between grades 10 and 12 or never expected to earn a bachelor's degree. The result is still a categorical variable, but the reference point—expectations for earning a bachelor's degree—is now constant in all three values.

The reader of table 6 will notice that most demographic background characteristics—gender, first generation college student status, second language background—do not appear because they did not meet the minimum selection criterion employed.[17] The race/ethnicity variable is present, although not statistically significant, in the model.

The reader will also notice that the null hypothesis is rejected: expectations *do* play a role in whether the first-time community college student ever attended a four-year college; whether an entering community college student applied to a four-year college before leaving high school is an irrelevant matter. While odds ratios are displayed in the table, the Delta-p statistic (Petersen, 1985; Cabrera 1994) is key to explaining what happens.[18] For table 6, Delta-p says that, controlling for the other variables in the equation,

- each step up the three-step expectations variable increases the probability of attending a four-year college by 12 percent;
- each step up the Academic Resources quintile account of secondary school performance increases the probability of attending a four-year college by 9.6 percent;
- each step up the SES quintile ladder increases the probability of attending a four-year college by 6.3 percent, though with a significance of .10, this variable is marginal, at best.

In short, education expectations is the strongest variable in the equation, even though the model itself is not overwhelmingly explanatory.[19] The percent of probabilities correctly predicted, 77.2, is acceptable, but not as convincing as some that we will mark at later points in this history.

---

[17]The software program (SAS) has a default that allows into the logistic model any variable with at least a .95 confidence level ($p < .05$). The models in this study override this default by lowering the confidence level to .80 ($p < .20$), thus admitting more variables into the equation. The more generous threshold, however, does not mean that the variables will ultimately turn out to be significant in the model. If the *t* statistic was less than 0.5 in a trial model, the variable was dropped from both the model and its presentation.

[18]For the computation of Delta p, I am using a short-cut recommended by Paul Allison of the University of Pennsylvania: $bp(1-p)$, where b is the logistic coefficient and p is the probability for the dependent variable in the model. This heuristic produces slightly higher values than the formula advanced by Petersen (1985).

[19]The same observation, applied to determinants of entering a four-year versus a two-year college, was made by Alexander, Holupka, and Pallas (1987) based on the initial postsecondary histories of both the High School Class of 1972 (NLS-72) and High School Class of 1980 (High School and Beyond/Senior Cohort).

Table 6. Logistic account of the likelihood of attending a four-year college at any time by 1992 12th-graders who first entered community colleges and earned any credits from community colleges

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Odds ratio	Delta p
Intercept	-4.5117	.4432	-6.09	.001		
Education expectations	**0.4909**	**.0832**	**3.53**	**.01**	**1.63**	**0.120**
Academic Resources[a]	**0.3939**	**.0799**	**2.95**	**.05**	**1.54**	**0.096**
SES Quintile	**0.2577**	**.0756**	**2.04**	**.10**	**1.32**	**0.063**
No delay of entry	0.5789	.2285	1.52		1.97	
Race	-0.5655	.2351	-1.44		0.62	
Applied to four-year	0.3591	.1976	1.09		1.83	
Parenthood	-0.3244	.3318	-0.59		0.59	

[a] Composite index of high school academic background (academic curriculum intensity, class rank/GPA, and 12th grade test score), originally developed by the author (Adelman 1999), and described on p. 20 above.

NOTES: Statistically significant variables are highlighted in bold. Design effect = 1.67. See Appendix B for an account of design effects in this study. Universe consists of all 1992 NELS panel students who first attended community colleges and were not missing values for the eight variables in the model. Weighted N = 516k. Standard errors are adjusted for design effects. $G^2 = 2811.97$; $df = 2042$; $G^2/df = 1.38$; X^2 (df) = 491.89 (6); p = .001. Percent of concordant probabilities predicted: 77.2.

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).

This section, addressing one of the prime factors in the literature on community college student histories, is designed to refine our sense of what precollegiate expectations mean, not to delineate a final story line on degree completion at any level. Whether the community college experience early in students' postsecondary careers has any impact of education expectations, and, if so, in which direction, is a topic to be revisited when the cooling out/diversionary critique of community colleges is considered in Part VI.

-III-
First Portrait:
Students Who Started Their Postsecondary Careers in a Community College

Summary

The portrait of those whose first move into the postsecondary universe to the town of the community college draws on the histories of the high school graduating classes of 1972, 1982, and 1992 along with the Beginning Postsecondary Students Longitudinal Study of 1995/96–2001. We thus consider 30 years of trend data.

Among traditional-age students, approximately 40 percent of postsecondary entrants start out at a community college, and this percentage has not changed since the early 1980s. For older beginning students, i.e., those starting out at age 24 or more, over 60 percent start at community colleges, and these students are more likely to think of themselves as employees than students. Over half of the older students have children, and they are far less likely to transfer anywhere in their undergraduate histories than those who start in community colleges before they are 21. *The primary potential transfer universe is that of traditional-age students; hence, it behooves us to examine the academic paths that bring them into town, the residential histories of those who succeed, and the processes of the environment that are barriers to moving on.*

With the exception of Latinos, minority students are no more likely to start in community colleges than white students, and this has been true for 30 years. At the same time, the community college pulls higher proportions of students from lower SES quintiles, from second-language backgrounds, and who are first generation. In a 30-year account of the geo-demography of entering community college students, we see no differences by urbanicity of high school (if anything, students from urban high schools were slightly less likely to start in community colleges than those from suburban or rural high schools), but there are significant variations by census division, ranging from the New England (low) to Pacific (high) divisions. *Community college enrollment planning for traditional-age students—hence community college relations with secondary schools—will vary in each of the nine census divisions.*

Traditional-age students entering community colleges arrive in town with less academic momentum than those starting in four-year colleges. While there has been a noticeable improvement over the past 20 years, 44 percent of those who started in community colleges compared to 11 percent of those who started in four-year colleges never reached algebra 2 in high school. Fifty-five percent

of these students take two or more remedial courses, and 72 percent of those who take two or more remedial courses earn no credential whatsoever. *The extent to which community colleges, working with high schools, can move more secondary school students to the level of algebra 2 and beyond will signal a major change in academic momentum, and substantially reduce remediation at the postsecondary level.*

Twenty-seven percent of traditional-age students for whom the community college is the first institution of attendance delay entry by eight or more months following high school exit compared with 6 percent of those who first entered four-year colleges, thus losing academic continuity and momentum. Delayed entry is one of the major hazards on the road to degree completion. *While the community college is an open-door institution, and accepts students whenever they decide to enroll, to the extent to which creative concurrent and continuous enrollment programs can increase the proportion of students entering within seven months of high school graduation should contribute to a longer period of residence, and more sustained involvement with the academic economy of the town.*

Of all traditional-age students who attend a community college at any time in their postsecondary careers, 26 percent started out somewhere else, principally in four-year colleges. The community college is not the responsible institution for four-year "drop-ins," alternating enrollment students based in four-year colleges, or even undergraduate reverse transfers, the majority of whom do not move to the community college until three or more years after they first enter the four-year college. *Most temporary transfers to community colleges are tourists, earn minimal credits from community colleges, and are most profitably accounted for in separate analyses.*

Roughly one-third of traditional-age students who attended a community college at some time earned 10 or fewer credits from the community college and hence are dubbed "incidental community college students." More than 40 percent of these students were based in four-year colleges. But 50 percent of the incidental students were based in community colleges themselves, and half of this group, in turn, did not even attempt more than 10 credits of course work. *Community colleges need a reporting scheme and metric that separates the incidental from its nonincidental populations. Failures in persistence and completion among nonincidental students are consequences of very different combinations of environmental problems and student academic momentum than failures among incidental students, many of whom attend for* ad hoc *purposes, and cannot be considered degree candidates.*

Consider the moment of first postsecondary attendance. Of those moving into town, so to speak, students at or above age 24 come from completely different trajectories than students who entered at age 20 or less, though they wind up on the same "stranger's path." The data set to use for this analysis is an event-cohort, the Beginning Postsecondary Students Longitudinal Study of 1995/96–2001, and table 7 sets out the basics.

Table 7. Type of institution of first attendance by age at date of entry of students who first entered postsecondary education in 1995–96

Age at entry	Type of institution first attended				Percent by age bracket
	Four-year	Community college	Other two-year	Less than two-year	
All Students	40.9 (1.9)	45.4 (1.2)	4.5 (0.6)	9.2 (0.9)	
16-20	51.2 (1.9)	40.6 (1.5)	3.4 (0.5)	4.8 (0.6)	**73.0 (1.7)**
21-23	22.5 (2.5)	45.7 (3.8)	10.7 (1.9)	21.1 (2.6)	**6.7 (0.6)**
24-29	10.6 (1.5)	64.4 (3.7)	7.7 (1.2)	17.3 (2.4)	**8.8 (0.9)**
30 or More	10.7 (1.5)	59.4 (3.1)	5.5 (0.8)	24.4 (2.5)	**11.6 (0.8)**

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics, Beginning Postsecondary Students Longitudinal Study, 1995/96-2001, Data Analysis System.

The most basic observation is that roughly one out of eight beginning postsecondary students is at least 30 years old and, of this group, the community college and less-than-two-year institutions capture the lion's share. Compared to those who start out in the traditional-age bracket, the proportion of those who delay entry to age 21–23 is weighted dramatically more towards less-than-two-year institutions and associate degree granting institutions other than community colleges, and dramatically less toward four-year colleges.

The key group for our purposes are students entering college by age 20. Among them, the proportion for whom the community college was the first institution of attendance (40.6 percent) is almost exactly the same as that of the NELS:88/2000 grade cohort (40.4 percent). When an event-cohort and a grade cohort from roughly the same period (early-to-mid-1990s) match that closely, we can be very confident in the result.

When one confines the BPS:96/01 universe to those whose first institution of attendance was a community college, a number of very distinct aspects of life histories are evident by age: primary role (student or employee, and marital status and dependents) as set forth in table 8, and transfer behavior, as displayed in table 9, for example. These are key features in the decision of this monograph to divide the population by age, and to focus on traditional-age students. This focus precludes economic analyses that assume sophisticated rational decisions on the part of high school students about where and when to pursue higher education, decisions involving opportunity costs, tuition analyses, differential wage rates, and return on educational investments (e.g., Rouse 1994; Kane and Rouse 1995; Hilmer 1997), whereas such analyses have been shown to make sense for students who are balancing the multiple obligations of adulthood (Leigh and Gill 1997).

Table 8. Student or employee primary role, and family status of students who entered postsecondary education in 1995–96 and whose first institution of attendance was a community college, by age at date of entry

Age at entry	Primary role: student or employee		**Family status**			
	Student	Employee	**Single, no children**	**Single with children**	**Married, no children**	**Married with children**
All Students	61.8 (2.0)	38.2 (2.0)	**74.2 (1.7)**	**11.0 (1.4)**	**5.2 (0.8)**	**9.7 (1.0)**
16-20	76.2 (1.9)	23.8 (1.9)	**94.1 (0.8)**	**4.3 (0.7)**	**0.8 (0.2)**	**0.8 (0.3)**
21-23	43.0 (7.3)	57.0 (7.3)	**62.6 (5.7)**	**20.3 (4.9)**	**8.4 (2.7)**	**8.6 (2.7)**
24-29	25.1 (6.8)	74.9 (6.8)	**35.8 (6.0)**	**28.6 (7.2)**	**9.2 (3.1)**	**26.4 (5.3)**
30 or More	26.3 (4.6)	73.7 (4.6)	**17.5 (4.4)**	**23.3 (3.2)**	**21.0 (4.2)**	**38.2 (3.7)**

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics, Beginning Postsecondary Students Longitudinal Study, 1995/96-2001, Data Analysis System.

Students who regard themselves primarily as employees who happen to be taking courses will write very different education histories than those who think of themselves primarily as students who, if they are working at all, are working to meet education expenses. By age 24, 75 percent of those starting out in community colleges in 1995–96 were in their own judgment on a trajectory dominated by work, not school. By the same age, too, a strong majority of those who started their careers in community colleges were married or had children, or both, two features of life that place demands on the student's time and space that are were not present at age 20. They live in different neighborhoods of the town than younger students, and utilize different services at a different pace.

These are conditioning features of enrollment intensity, continuity, and mobility. For those BPS:96/01 students who started in a community college, transfer to any other institution and particularly to a four-year institution during the six-year period covered by the study appears directly related to age (see table 9). For the BPS:96/01, transfer was defined as a movement from one institution to a second or third, or fourth at which the student was enrolled for at least four months. While this definition is different from that used in the transcript-based longitudinal studies such as the NELS:88/2000,[20] it produces similar results for traditional-age students. There is no question, however, that the older the student at the point of first entry to higher education (and to the community college as the first institution of attendance), the less likely he or she is to transfer anywhere. In accounts of transfer, using a denominator of community college students of all ages thus produces a very distorted picture.

Table 9. Percent of 1995-96 beginning students who started in a community college who transferred by 2001 to at least one other institution, by type of transfer destination and age of student at entry to postsecondary education

Age at entry	Transfer destination institution types, 1995–2001				
	Four-year only	Four-year and community college	Community college	Other	No transfer
All first time enrollees at community colleges	25.2 (1.8)	3.6 (0.7)	8.2 (0.9)	4.4 (0.7)	58.5 (2.0)
Age in Dec.1995					
16–20	32.9 (2.1)	5.0 (1.0)	8.5 (1.1)	5.0 (0.9)	48.6 (2.3)
21–23	18.6 (5.8)	4.1 (2.1)	9.0 (3.4)	6.3 (3.9)	62.0 (6.9)
24–29	7.7 (2.7)	0.0	8.6 (3.4)	3.3 (1.9)	80.4 (4.2)
30 or More	7.5 (2.5)	0.5 (0.5)	6.4 (2.3)	1.8 (1.1)	83.8 (3.5)

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics, Beginning Postsecondary Students Longitudinal Study, 1995/96-2001, Data Analysis System.

There is a compelling reason for emphasizing the population that begins its postsecondary career in community colleges: the institution that serves as the student's entry point sets the tone for a student's expectations and the trajectory for the student's experience (Rouse 1994; Pascarella and Terenzini 1991)—which may be a fragmentary journey that ends in nothing or a voyage of discovery. When one adds traditional-age to the criterion, the metaphor of settlement arises: one doesn't arrive in a place to begin a new life if one has not started out from another. That other place is the secondary school, and the sequence that brings students to community college from secondary schools plays a significant role in this account.

[20]In a transcript-based history, the definition of transfer is built from enrollment sequence and credits, not elapsed time.

Dividing the universe of institutions into three categories: all bachelor's degree granting institutions (four-year), all public two-year institutions (community colleges), and all other sub-baccalaureate institutions (including private and for-profit two-year institutions, area vocational-technical institutes, and career and trade schools), we find some notable trends regarding the places first attended by the high school classes of 1972, 1982, and 1992. The universe in all cases consists of those who reached the 12th grade in the year they were scheduled to be in the 12th grade. This marker was determined by the oldest of the studies, that of the High School Class of 1972, which began in the 12th grade. The other two studies began at the 10th grade (class of 1982) and the eighth grade (class of 1992), but were truncated to match.

Standard Demographics

Table 10 takes up the major demographic distinctions among 12th-graders of 1972, 1982, and 1992 by type of first postsecondary institution attended (four-year colleges, community colleges, and other sub-baccalaureate institutions). What are the principal features of this landscape?

General, Gender, Age

- The community college share of the first institution universe increased between the high school class of 1972 and that of 1992, not at the expense of four-year colleges, rather in relation to the proportion of the 12th-graders entering other sub-baccalaureate institutions. In fact, the decline in the percentage of entering postsecondary students who start in other sub-baccalaureate institutions ripples through other demographic variables and is probably the most meaningful change in the distribution of entering *traditional-age* students between 1972 and 2000.

- The increase in the community college share of the first institution universe was greater for men than for women. The proportion of women entering community colleges increased between the class of 1972 and the class of 1982, but fell back with the class of 1992.

- In all three high school classes, there was a small percentage of 12th-graders who were older, i.e., at least 20 years old. This group of students appears to enroll first in community colleges and other sub-baccalaureate institutions rather than four-year colleges. The standard errors of the estimates are large, and comparisons are thus problematic. But the percentage distributions across the three institutional-type groupings are consistent in the three cohorts, and thus modestly persuasive.

Race/ethnicity

- For the period 1972–2000, there were no statistically significant differences in the proportions of *traditional-age* white, African-American, and Asian students for whom the community college was the first institution of attendance. The range for all three race/ethnicity groups in all three cohorts was between 36 and 39 percent.

- On the other hand, the proportion of traditional-age Latino postsecondary students for whom the community college was the first institution of attendance has ranged between 53 and 56 percent over the three cohort histories. Comparisons between Latinos and each of the other three major race/ethnicity groups are significant, and have been observed in other studies (e.g., Lee and Frank 1990). Oddly, these differences do not surface in the Beginning Postsecondary Students Longitudinal Study of 1995/96-2001 (see Appendix C, table C-10).

- American Indians present a dilemma in analyses such as this one because the group is small and the standard errors so large as to preclude comparisons. However, we can say that American Indians attend four-year colleges at far lower rates than all other race/ethnicity groups except Latinos.

- It follows from the bullets immediately above that statements that claim a majority of minority students begin postsecondary education in a community college do not apply to traditional-age students. In fact, in the Beginning Postsecondary Students Longitudinal Study of 1995/96–2001, those claims do not apply to older students, either (see Appendix C, table C-10).

Socioeconomic Status

- Traditional-age students whose families were in the highest two socioeconomic status quintiles were more likely to start in a four-year college than either a community college or other sub-baccalaureate institution, and the percentage distribution across the three types was consistent over the 28-year period at issue.

- Among students in the lowest socioeconomic status quintile, the proportion starting out in community colleges increased considerably (from 44 to 55 percent) over the histories of the three cohorts under consideration. This change parallels the distribution of socioeconomic status quintile in the entering traditional-age postsecondary student body writ large: where 1 = highest quintile and 5 = lowest quintile, the average SES has fallen from 2.75 (s.e.= 0.27) for the High School Class of 1972 to 3.09 (s.e.= 0.49) for the High School Class of 1992. That is, a higher proportion of traditional-age students are coming from lower SES brackets (see also Adelman 2004, table 2.4, page 24)**.**

First-generation and Language Background

- The proportion of traditional-age postsecondary students who come from first-generation families has dropped substantially, from 40 percent in the High School

Class of 1972 to 21 percent in the High School Class of 1992. At the same time, the proportion of students who came from families in which at least one parent had earned a bachelor's degree rose from 30 percent to 37 percent, and the proportion of those from families with at least one parent recording some postsecondary education rose from 30 to 42 percent. This trend reflects a common-sense consequence of expanding enrollment in postsecondary education over the past three decades.

- From a distribution of parity between four-year colleges and community colleges as the first institution of attendance in the class of 1972 (47 percent entering four-year colleges versus 45 percent entering community colleges), first generation college students came to favor community colleges by the class of 1992 (52 percent entering community colleges versus 40 percent entering four-year colleges). The community college share also increased among students for whom at least one parent had some postsecondary education but not a bachelor's degree.

- Students from language backgrounds other than English enroll in community colleges and four-year colleges in roughly the same proportions, whereas those from English dominant or English monolingual backgrounds favor initial enrollment in four-year colleges by roughly 15 percentage points.

Table 10. First institution of attendance of 12th-graders from the high school classes of 1972, 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by major demographic characteristics

Demographic characteristics	First institution of attendance: Four-year	Community college	Other Sub-bacc[a]	Percent of all in group
All 12th-graders				
Class of 1972	55.2 (0.81)	36.9 (0.82)	7.9 (0.40)	
Class of 1982	53.1 (0.97)	39.3 (0.93)	7.5 (0.47)	
Class of 1992	55.2 (1.09)	40.0 (1.09)	4.8 (0.37)	
By gender				
Men				
Class of 1972	56.4 (1.00)	36.9 (0.98)	6.7 (0.47)	**50.6 (0.66)**
Class of 1982	55.6 (1.28)	37.4 (1.22)	7.0 (0.61)	**46.2 (0.79)**
Class of 1992	53.5 (1.49)	42.9 (1.49)	3.6 (0.39)	**46.8 (0.66)**
Women				
Class of 1972	54.0 (0.97)	36.9 (0.98)	9.1 (0.58)	**49.4 (0.66)**
Class of 1982	51.0 (1.24)	41.0 (1.19)	8.0 (0.69)	**53.8 (0.79)**
Class of 1992	56.6 (1.39)	37.5 (1.37)	5.8 (0.58)	**53.2 (0.96)**
By age in scheduled high school graduation year				
20 and up				
Class of 1972	32.5 (3.50)	54.6 (3.65)	12.9 (2.30)	**3.5 (0.17)**
Class of 1982	31.3 (6.99)	55.8 (7.30)	12.9 (4.43)	**2.3 (0.20)**
Class of 1992	33.8 (7.76)	55.5 (7.77)	10.7 (3.13)	**3.8 (0.43)**
18 and 19				
Class of 1972	55.9 (0.80)	37.9 (0.82)	6.2 (0.31)	**93.8 (0.22)**
Class of 1982	52.2 (0.97)	39.7 (0.94)	8.1 (0.46)	**97.6 (0.23)**
Class of 1992	55.7 (1.10)	39.7 (1.10)	4.5 (0.36)	**95.0 (0.48)**
Under 18				
Class of 1972	61.0 (2.88)	35.5 (2.97)	3.5 (1.04)	**2.7 (0.15)**
Class of 1982	72.7 (5.42)	20.8 (4.87)	6.5 (3.21)	**1.0 (0.12)**
Class of 1992	70.7 (10.4)	28.7 (10.5)	0.6 (0.60)	**1.2 (0.20)**

See notes at end of table.

Table 10. First institution of attendance of 12th-graders from the high school classes of 1972, 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by major demographic characteristics–Continued

Demographic characteristics	**First institution of attendance** Four-year	Community college	Other Sub-bacc[a]	**Percent of all in group**
By race/ethnicity				
White				
Class of 1972	56.3 (0.86)	36.0 (0.87)	7.7 (0.44)	**85.7 (0.57)**
Class of 1982	54.3 (1.08)	38.4 (1.07)	7.3 (0.53)	**81.5 (0.78)**
Class of 1992	57.4 (1.22)	38.3 (1.21)	4.3 (0.37)	**74.2 (1.32)**
African-American				
Class of 1972	53.2 (2.02)	36.8 (1.99)	9.9 (1.21)	**9.1 (0.50)**
Class of 1982	52.3 (2.44)	38.3 (2.38)	9.4 (1.47)	**10.3 (0.65)**
Class of 1992	54.2 (3.55)	38.8 (3.70)	7.0 (1.56)	**10.5 (0.90)**
Latino				
Class of 1972	38.0 (3.41)	56.3 (3.52)	5.7 (1.50)	**3.3 (0.28)**
Class of 1982	38.9 (2.96)	52.5 (2.82)	8.6 (1.57)	**5.4 (0.34)**
Class of 1992	38.6 (3.16)	54.8 (3.34)	6.6 (1.65)	**9.4 (0.91)**
Asian				
Class of 1972	61.4 (4.60)	37.3 (4.53)	1.3 (0.76)	**1.2 (0.15)**
Class of 1982	60.1 (4.14)	37.6 (4.24)	2.3 (1.51)	**1.8 (0.18)**
Class of 1992	59.0 (3.89)	37.4 (3.85)	3.7 (1.45)	**5.0 (0.47)**
American Indian				
Class of 1972	35.0 (6.19)	47.3 (6.49)	17.8 (5.58)	**0.7 (0.09)**
Class of 1982	34.2 (6.80)	53.1 (8.15)	12.7 (4.13)	**1.0 (0.19)**
Class of 1992	35.4 (9.17)	58.2 (9.88)	6.4 (2.54)	**0.8 (0.25)**

See notes at end of table.

Table 10. First institution of attendance of 12th-graders from the high school classes of 1972, 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by major demographic characteristics–Continued

Demographic characteristics	First institution of attendance: Four-year	Community college	Other Sub-bacc[a]	Percent of all in group
By SES quintile[b]				
Highest				
Class of 1972	70.4 (1.05)	26.0 (1.04)	3.6 (0.39)	**31.0 (0.74)**
Class of 1982	72.7 (1.51)	23.8 (1.48)	2.3 (0.50)	**29.1 (0.96)**
Class of 1992	77.7 (1.66)	20.4 (1.63)	1.9 (0.50)	**29.1 (1.15)**
Second quintile				
Class of 1972	55.7 (1.24)	37.6 (1.23)	6.7 (0.63)	**23.5 (0.45)**
Class of 1982	54.5 (1.73)	39.7 (1.77)	5.5 (0.76)	**24.8 (0.73)**
Class of 1992	55.2 (2.02)	41.5 (2.05)	3.3 (0.44)	**25.3 (0.88)**
Third quintile				
Class of 1972	47.1 (1.38)	44.0 (1.42)	8.9 (0.94)	**19.5 (0.47)**
Class of 1982	45.1 (1.76)	46.2 (1.88)	8.1 (1.06)	**20.2 (0.71)**
Class of 1992	46.6 (2.04)	48.7 (2.11)	4.7 (0.61)	**20.2 (0.74)**
Fourth quintile				
Class of 1972	43.2 (1.44)	44.1 (1.50)	12.7 (1.15)	**14.6 (0.41)**
Class of 1982	38.6 (1.87)	47.3 (2.05)	13.1 (1.46)	**16.1 (0.64)**
Class of 1992	39.5 (1.98)	53.3 (2.09)	7.2 (0.96)	**15.4 (0.62)**
Lowest quintile				
Class of 1972	41.7 (1.67)	44.0 (1.67)	14.3 (1.30)	**11.4 (0.40)**
Class of 1982	32.6 (2.45)	50.1 (2.62)	17.0 (2.14)	**9.9 (0.54)**
Class of 1992	32.2 (3.00)	54.9 (3.43)	13.0 (2.19)	**10.0 (0.73)**

See notes at end of table.

Table 10. First institution of attendance of 12th-graders from the high school classes of 1972, 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by major demographic characteristics–Continued

Demographic characteristics	First institution of attendance: Four-year	Community college	Other Sub-bacc[a]	Percent of all in group
By generational status[c]				
First generation				
Class of 1972	46.7 (0.99)	44.5 (1.06)	8.8 (0.57)	**39.6 (0.69)**
Class of 1982	40.1 (1.38)	47.4 (1.44)	12.6 (0.94)	**34.6 (0.87)**
Class of 1992	39.5 (2.07)	52.0 (2.19)	8.6 (0.99)	**21.1 (0.91)**
Parents had some PSE				
Class of 1972	54.7 (1.16)	39.8 (1.15)	5.5 (0.45)	**30.2 (0.52)**
Class of 1982	48.8 (1.40)	42.5 (1.42)	8.7 (0.80)	**31.8 (0.75)**
Class of 1992	47.1 (1.55)	47.7 (1.59)	5.2 (0.62)	**41.6 (1.02)**
Parents earned Bachelor's or higher				
Class of 1972	70.2 (1.11)	26.7 (1.12)	3.1 (0.33)	**30.3 (0.70)**
Class of 1982	69.5 (1.42)	28.1 (1.38)	2.6 (0.48)	**33.7 (0.95)**
Class of 1992	75.2 (1.46)	23.0 (1.43)	1.8 (0.33)	**37.3 (1.16)**
By second language backround[d]				
Non-native speaker				
Class of 1982	48.1 (2.77)	43.8 (2.74)	8.1 (1.58)	**5.2 (0.32)**
Class of 1992	47.8 (3.28)	46.4 (3.41)	5.8 (1.48)	**10.2 (0.90)**
English dominant				
Class of 1982	53.4 (0.99)	39.1 (0.97)	7.5 (0.48)	**94.8 (0.32)**
Class of 1992	55.7 (1.15)	39.6 (1.16)	4.7 (0.38)	**89.8 (0.90)**

[a] Other sub-baccalaureate institutions include associate degree granting schools other than community colleges, area vocational-technical institutes, and trade schools that grant only certificates, not degrees.
[b]Socioeconomic status quintile was constructed the same way in all three cohorts: a combination of family income, highest education of any parent, parents' Duncan SEI occupational prestige scale. The index was first set out in percentiles, then weighted and divided into quintiles. Data are for students with positive values only.
[c]Generational status was determined by the highest level of education of either parent. If neither parent had any postsecondary education, the student was labeled "first generation."
[d] Second language background could be compared only for the high school classes of 1982 and 1992, where the definitions were roughly parallel: the student indicated a first language other than English and conversed with their mothers all or most of the time in that language in the 12th grade. The variables in the NLS-72 (High School Class of 1972) do not allow for a parallel definition.
NOTES Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding. Weighted Ns for all with known first institution of attendance: class of 1972= 1.87M; class of 1982= 1.95M; class of 1992= 2.03M.
SOURCES: National Longitudinal Study of the High School Class of 1972 (NCES unnumbered CD); High School and Beyond/Sophomore Cohort (NCES 2000-194); National Education Longitudinal Study of 1988\2000 (NCES 2003-402).

Geo-demographics: Urbanicity, Census Division, and Proximity

In addition to personal demographics, geo-demographics should be considered in accounting for preferences in the first institution of attendance, and table 11 does so. Some of the changes across the histories of the three high school classes under consideration are dramatic. The transcript-based distribution teaches us that some mythologies are just that—mythologies, and other features of cohort history have simply never been noticed.

As a prime example of mythology, we have three decades of data on where students from urban, suburban, and rural high schools who reached the 12th grade first enter postsecondary education. What do we see?

- Students from urban high schools are no more likely to start out in community colleges than are students from either suburban or rural high schools.[21]
- In the high school classes of 1972 and 1982, students from rural high schools were more likely to start out in institutions classified as other sub-baccalaureate than students from the other two urbanicity categories.
- In all three categories of urbanicity, the community college share of entering students has remained steady.

More significant than urbanicity, though, is census division, that is, a more refined version of region-of-the-country than the usual gross presentations of Northeast, South, Midwest, and West, and one that plays an important role in economic models of decisions to enroll in community colleges (Betts and McFarland 1996). When Clark revisited his 1960 cooling out thesis in 1980, he added "regional variation" as a caveat (Clark 1980), and Rouse (1998) demonstrated considerable variation in the comparative weights of full-time enrollments in community colleges, by state. The details show:

- Extremes in the proportion of entering postsecondary students who start in community colleges: a consistent low (and trending lower) in New England to a consistent high (but trending lower) in the Pacific census division. The latter is obviously influenced by the size of the California community college system, which enrolls one out of every five community college students in the country;
- A dramatic rise over the three cohorts in the community college share of entering traditional-age students in the West South Central census division (Texas, Oklahoma, Arkansas, and Louisiana), no doubt influenced by both the increases in the Latino population in that area and the increase in Latino access rates;[22] and
- The comparatively high share of entering postsecondary students claimed by other sub-baccalaureate institutions in both the West North Central and East South Central census divisions during the histories of the high school classes of 1972 and 1982, followed by a steep drop in that share for the class of 1992.

---

[21]Rouse (1994) noted that "those living in central cities are much more likely to attend four-year schools." (p. 72).

[22]See Adelman 2004, table 2.4, p. 24.

Table 11. First institution of attendance of 12th-graders from the high school classes of 1972, 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by census division and urbanicity of high school location

Census division of high school[a]	**First institution of attendance** Four-year	Community college	Other sub-baccalaureate
New England			
Class of 1972	59.4 (3.46)	29.5 (2.68)	11.1 (1.90)
Class of 1982	65.8 (3.56)	26.9 (3.33)	7.4 (1.47)
Class of 1992	72.4 (4.59)	19.9 (4.33)	7.7 (2.44)
Mid Atlantic			
Class of 1972	63.2 (1.64)	28.3 (1.63)	8.5 (1.03)
Class of 1982	61.0 (2.33)	30.4 (1.99)	8.5 (1.19)
Class of 1992	66.5 (2.44)	26.9 (2.40)	6.6 (1.00)
E North Central			
Class of 1972	58.1 (1.66)	35.9 (1.72)	6.0 (0.67)
Class of 1982	54.2 (1.97)	40.3 (1.91)	5.6 (0.78)
Class of 1992	59.3 (2.34)	37.8 (2.33)	2.9 (0.50)
W North Central			
Class of 1972	55.3 (2.66)	28.4 (2.41)	16.3 (2.13)
Class of 1982	58.5 (2.84)	27.2 (2.89)	14.3 (2.27)
Class of 1992	58.6 (3.96)	37.1 (4.01)	4.3 (1.00)
South Atlantic			
Class of 1972	50.4 (1.93)	42.4 (1.99)	7.2 (0.97)
Class of 1982	47.6 (2.99)	45.4 (2.87)	7.0 (1.16)
Class of 1992	53.9 (2.88)	41.9 (2.88)	4.3 (0.83)
E. South Central			
Class of 1972	57.0 (2.94)	32.0 (2.78)	11.0 (1.58)
Class of 1982	44.2 (4.21)	44.3 (4.41)	11.6 (2.58)
Class of 1992	56.9 (3.91)	39.2 (4.10)	3.9 (0.94)
W. South Central			
Class of 1972	65.9 (2.36)	28.2 (2.41)	5.9 (0.98)
Class of 1982	55.8 (3.33)	35.5 (2.89)	8.7 (1.66)
Class of 1992	50.2 (3.38)	45.1 (3.49)	4.8 (1.25)
Mountain			
Class of 1972	63.3 (3.60)	30.0 (3.54)	6.7 (1.30)
Class of 1982	50.0 (5.03)	42.7 (5.42)	7.3 (1.61)
Class of 1992	53.3 (3.85)	41.9 (3.92)	4.8 (1.23)
Pacific			
Class of 1972	30.6 (1.74)	65.8 (1.92)	3.6 (0.61)
Class of 1982	33.8 (2.81)	60.6 (2.86)	5.6 (1.18)
Class of 1992	35.5 (2.80)	59.6 (2.84)	4.9 (1.30)

See notes at end of table.

Table 11. First institution of attendance of 12th-graders from the high school classes of 1972, 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by census division and urbanicity of high school location–Continued

Urbanicity of high school	First institution of attendance		
	Four-year	Community college	Other sub-baccalaureate
Urban			
Class of 1972	57.5 (1.01)	35.0 (1.02)	7.5 (0.54)
Class of 1982	54.1 (2.27)	37.9 (2.18)	8.0 (0.95)
Class of 1992	57.0 (1.97)	37.8 (2.02)	5.2 (0.79)
Suburban			
Class of 1972	55.9 (1.33)	37.5 (1.35)	6.7 (0.60)
Class of 1982	53.5 (1.46)	40.7 (1.42)	5.8 (0.59)
Class of 1992	54.8 (1.74)	40.9 (1.76)	4.3 (0.55)
Rural			
Class of 1972	49.1 (1.49)	40.5 (1.53)	10.4 (0.92)
Class of 1982	51.8 (1.76)	37.8 (1.78)	10.4 (1.05)
Class of 1992	53.7 (1.78)	41.2 (1.79)	5.1 (0.53)

[a]NCES longitudinal studies are not designed for state-level analysis. The closest one can approximate a state-level analysis is through the nine census divisions. In this analysis, the census division refers to the location of the student's high school. The nine census divisions are composed as follows:

New England: ME, NH, VT, MA, RI, CT
Mid-Atlantic: NY, NJ, PA, DE
East North Central: OH, MI, IN, IL, WI, MN
West North Central: ND, SD, IA, KS, NE, MO
South Atlantic: MD, DC, VA, WVA, NC, SC, GA, FL
East South Central: KY, TN, AL, MS
West South Central: LA, AR, OK, TX
Mountain: MT, ID, CO, WY, UT, NV, NM, AZ
Pacific: AK, HI, WA, OR, CA

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding.
SOURCES: National Longitudinal Study of the High School Class of 1972 (NCES unnumbered CD 1992); High School and Beyond/Sophomore Cohort (NCES 2000-194); National Education Longitudinal Study of 1988/2000 (NCES 2003-402).

More significant in considering the role of the community college as the first institution of attendance than urbanicity or census division is proximity, no matter where it occurs. As table 12 reveals of the Beginning Postsecondary Students Longitudinal Study of 1995/96–2001, the proximity factor is more prominent in the choice behavior of students who first entered community colleges[23] than those who first entered other types of institutions (for confirmation, see Rouse 1994, table 3.7, p.79).

Table 12. Percent of beginning postsecondary students in 1995–96 who selected their first institution of attendance because it was close to home, by type of first institution attended

Type of first institution attended, 1995–96	Percent who chose to enter their first institution because it was close to home	
All students	36.7%	(1.0)
Four-year college	31.7	(1.1)
Community college	45.7	(1.9)
Other two-year institution	16.7	(1.7)
Less than two-year	25.1	(2.0)

NOTE: Standard errors are in parentheses.

SOURCE: Beginning Postsecondary Students Longitudinal Study, 1995-2001, Data Analysis System.

As Rouse (1995) demonstrated, the effects of proximity extend beyond first institution of attendance to educational attainment in general. In structural models of attainment, proximity is accompanied by cost (since even for students who begin in four-year colleges, the proximate institution allows commuting, hence reducing housing costs), and, as economists would argue, rational choice behavior would include consideration of cost. What Rouse called “location effects” may be among the more important effects in understanding *not* whether students who start out in a community college transfer to a four-year institution and earn a bachelor’s degree, for example, but rather how much schooling beyond secondary school they receive at all.

The surveys of the grade-cohort longitudinal studies have not included a question about proximity since the NLS-72, but the question may be worth revisiting in the course of the new Education Longitudinal Study of 2002 (ELS-02), which began with a cohort of 10th-graders and will most likely extend to at least 2012.

[23]Surprisingly, though, among those who started in a community college, students over 30 (who we assume to be place-bound) were *less* likely to cite proximity than students between the ages of 16–20. But there were no statistically significant differences by age in citing proximity as the most important factor in the choice of first institution.

Precollegiate and Entrance Factors

From geo-demography and proximity, we turn to distinguish populations entering community colleges from those entering other types of institutions according to their high school academic background, timing of entry to postsecondary education, and intended postsecondary major. In analyzing trend data in these matters we can compare only the high school classes of 1982 and 1992, since the two longitudinal studies included parallel sets of high school transcripts.[24] Tables 13, 14, 15, and 16 set out some key comparisons that draw on these high school transcript records.

The first of the comparisons of the high school classes of 1982 and 1992 in table 13 invokes the academic intensity of one's high school curriculum, a construct involving different combinations of Carnegie Units earned in major subjects, with distinctions between all science courses and core laboratory science courses, highest level of mathematics, and additions in number of advanced placement courses, computer science credits, and any remedial courses. There were 40 combinations of these components for the High School Class of 1982 (Adelman 1999) and 31 for the High School Class of 1992. At the highest rung on the academic intensity ladder a student from the class of 1992 shows 3.75 or more units of English, 3.75 or more of mathematics with highest level of math beyond algebra 2 (trigonometry, precalculus, or calculus), more than 2 units each of foreign language, core laboratory science, and social studies, any units of computer science, and more than 1 advanced placement course. The 31 combinations are set out in quintiles by the weighted distribution of students. Table 13 reveals two phenomena about the relationship between academic intensity and the first institution of attendance:

- In both the class of 1982 and the class of 1992, the lower the student's academic intensity quintile, the more likely they are to start out at a community college.

- Comparing the class of 1992 and the class of 1982, a higher proportion of students in the top two academic intensity quintiles started out in four-year colleges, with a corresponding drop in the proportion of these academically well-prepared students beginning their postsecondary careers in community colleges.

The tenor of these observations is reinforced by a consideration of the highest level of mathematics a student reached in high school (table 14). To dramatize the contrasts, this variable is presented in a distribution *within* type of first postsecondary institution. The reader will note an upswing across all institutional types, that is, higher percentages of students in the High School Class of 1992 completing algebra 2, trigonometry, precalculus, and calculus, and a considerable drop between the classes of 1982 and 1992 in the proportion of students entering postsecondary education with less than algebra 2. But in terms of getting beyond algebra 2 in

---

[24]The NLS-72 longitudinal study (High School Class of 1972) did not include transcript data, rather high school records that were filled out by high school administrators following a standardized template. These are not comparable to the high school records in the other two grade-cohort longitudinal studies.

high school, the population starting out in community colleges lags considerably behind the population beginning in four-year colleges. Should this gap narrow among traditional-age students, it will signal an important change in the academic momentum of in-coming traditional-age community college students.

Table 13. First institution of attendance of 12th-graders from the high school classes of 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by the academic intensity of their high school curriculum

Academic intensity of high school curriculum	First institution of attendance		
	Four-year	Community college	Other sub-baccalaureate
HS academic intensity quintile[a]			
Highest quintile			
Class of 1982	81.7 (1.32)	17.7 (1.31)	0.6 (0.17)
Class of 1992	89.2 (1.19)	10.1 (1.17)	0.8 (0.24)
Second quintile			
Class of 1982	61.7 (1.73)	33.7 (1.66)	4.7 (0.71)
Class of 1992	70.2 (2.25)	28.2 (2.25)	1.6 (0.39)
Third quintile			
Class of 1982	44.2 (1.76)	47.2 (1.80)	8.6 (1.08)
Class of 1992	44.9 (1.99)	49.8 (2.05)	5.3 (0.87)
Fourth quintile			
Class of 1982	27.9 (2.06)	56.7 (2.26)	15.4 (1.75)
Class of 1992	32.5 (2.17)	60.9 (2.26)	6.6 (0.82)
Lowest quintile			
Class of 1982	22.2 (1.94)	62.0 (2.50)	15.8 (1.88)
Class of 1992	20.4 (2.11)	65.2 (2.61)	14.4 (1.82)

[a]The variable describes the academic intensity of a student's high school curriculum, following the analysis in Adelman (1999). For the High School Class of 1982 there were 40 bands of academic intensity; for that of the class of 1992, there were 31. In both cases, the distribution was aggregated to quintiles.
NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding. Weighted Ns. class of 1982 = 1.84M; class of 1992 = 2.03M.
SOURCES: National Center for Education Statistics: High School and Beyond/Sophomore Cohort (NCES 2000-194) and NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

The highest level of mathematics reached in high school is a component of the formulas used to determine the overall academic intensity of a student's high school curriculum, so it is not surprising that the Pearson correlation between the two is .7525 (p = .0001). The principal reason for citing the highest mathematics variable is that it is an indicator of mathematics momentum going forward into higher education, and will arise again when we consider the factors that contribute to transfer from a community college to a four-year institution.

Table 14. First institution of attendance of 12th-graders from the high school classes of 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by highest level of mathematics studied in high school

Institution of first attendance	**Highest level of mathematics studied in high school**			
	Calculus or precalculus	Trigo-nometry	Algebra 2	Less than algebra 2
Four-year college				
Class of 1982	21.9 (1.08)	16.3 (0.94)	30.7 (1.23)	31.1 (1.15)
Class of 1992	40.0 (1.48)	18.4 (1.21)	30.2 (1.29)	11.4 (1.27)
Community college				
Class of 1982	3.9 (0.47)	7.5 (0.74)	25.3 (1.19)	63.2 (1.35)
Class of 1992	7.6 (0.90)	11.9 (1.84)	37.0 (2.61)	43.5 (2.24)
Other sub-baccalaureate				
Class of 1982	0.9 (0.50)	2.3 (0.64)	22.8 (2.24)	73.9 (2.35)
Class of 1992	5.2 (1.65)	4.7 (1.13)	31.1 (4.45)	58.9 (4.25)

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding. Weighted Ns. class of 1982 = 1.84M; class of 1992 = 2.03M.
SOURCES: National Center for Education Statistics: High School and Beyond/Sophomore Cohort (NCES 2000-194) and NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Carroll (1989) demonstrated the hazards of delayed entry to postsecondary education, and the marker of entering within seven months of high school graduation is deemed to represent "no delay" of entry in this analysis. For a student graduating from high school in June 1992, for example, the no-delay criterion would be fulfilled by a first transcript term date of January 1993 or earlier. Table 15 shows an increase in on-time entry for first-time community college students from 66 percent to 73 percent between the high school classes of 1982 and 1992. Nonetheless, the proportion of entering community college students from the class of 1992 who entered directly from high school is 20 percent below that for four-year college entrants, and 20 percentage points above that of students who first entered other sub-baccalaureate institutions. There seems to be a clear hierarchy by institutional type in the matter of the timing of entry to postsecondary education.

Table 15. First institution of attendance of 12th-graders from the high school classes of 1982, and 1992 who entered postsecondary education at any time following the year in which they were scheduled to graduate from high school, by timing of entry to postsecondary education

Institution of first attendance	Length of delay between high school graduation date and first entry to postsecondary education		
	No delay	**8– to 18 months**	**19 or more months**
Four-year college			
Class of 1982	90.6 (0.66)	5.1 (0.48)	4.2 (0.49)
Class of 1992	93.5 (0.63)	3.8 (0.51)	2.7 (0.34)
Community college			
Class of 1982	65.6 (1.35)	14.4 (0.92)	20.0 (1.15)
Class of 1992	72.6 (1.56)	13.7 (1.33)	13.7 (1.06)
Other sub-baccalaureate			
Class of 1982	48.4 (3.20)	21.2 (2.66)	30.4 (3.05)
Class of 1992	51.5 (3.91)	16.2 (2.90)	32.3 (3.90)

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding. Weighted Ns. class of 1982 = 1.84M; class of 1992 = 2.03M.
SOURCES: National Center for Education Statistics: High School and Beyond/Sophomore Cohort (NCES 2000-194) and NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

There is also a hierarchy of entry date by type of high school diploma received. To illustrate this phenomenon, we use all students from the NELS:88/2000 who participated in the 1992 survey, whether or not they were in the 12th grade at that time, and who ultimately attended a community college.[25] Of this expanded group, a tiny fraction, .08 percent (s.e. = 0.19) never graduated from high school and 7.8 percent (s.e. = 1.16) received General Education Diplomas. Among those who received GEDs, 36 percent (s.e. = 7.97) did not enter postsecondary education at the community college until the fall term of 1996 at the earliest, versus 6.3 percent (s.e. = 0.66) of those who earned standard high school diplomas. It is not surprising that delay of entry for GED recipients is considerable.

As for what 12th-graders say they plan to study in postsecondary education, some of the changes between the High School Class of 1982 and the High School Class of 1992 evident in table 16 eventually played out among those who earned degrees. For example, at the bachelor's level,

[25] The reason for expanding the universe to the entire panel of NELS:88/2000 students who were survey participants in 1992, 1994, and 2000 is to maximize the GED population for comparative purposes. If we confined the universe to 1992 12th-graders who first entered postsecondary education through a community college, only 3.8 percent (s.e.=1.00) were GED recipients. That is too small a population on which to conduct meaningful analysis.

there was a decline between the 1980s and 1990s in the proportion of students earning degrees in both science and engineering fields and business, and a rise in the proportion earning degrees in education and the social sciences (Adelman 2004, table 5.1, p.61), and these data match changes in intended major indicated by 12th-graders in the two cohorts. The fact that precollegiate intentions about major hold true suggests that students are not frivolous in responding to a question about the future content of their postsecondary schooling when they are fairly close to the point of entry. It is possible, though not guaranteed, that these intentions may have some influence as to where they begin their postsecondary studies. When one compares the distribution of intended fields among those who started in community colleges with those who started in four-year colleges, the two broad areas in which the community college group held a distinct lead in both the class of 1982 and the class of 1992 were occupationally oriented: health services (which includes nursing, various medical therapies, and medical technologies) and a combined category of office occupations, trades, personal services (cosmetology, mortuary science, and child care) and precision production. In a moment we will bring this construct into a multivariate analysis of the factors associated with starting out in a community college.

Table 16. Planned postsecondary major as stated by 1982 and 1992 12th-graders who later entered postsecondary education, by type of institution first attended

Planned major as indicated in grade 12 survey	Institution of first attendance					
	Four-year college		Community college		Other sub-baccalaureate	
	Class of 1982	Class of 1992	Class of 1982	Class of 1992	Class of 1982	Class of 1992
Business	19.9 (0.93)	17.3 (0.82)	21.9 (1.29)	16.7 (1.19)	16.6 (2.77)	18.2 (3.67)
Education	4.5 (0.43)	9.5 (0.63)	3.7 (0.52)	7.6 (0.82)	1.8 (0.95)	3.5 (1.04)
STEM[a] Fields	27.3 (1.00)	21.5 (0.94)	19.3 (1.15)	15.2 (1.29)	17.9 (2.78)	8.9 (1.83)
Health services	7.4 (0.60)	7.0 (0.56)	11.6 (1.06)	12.3 (1.08)	15.4 (3.04)	7.8 (1.44)
Humanities and arts	8.2 (0.60)	8.1 (0.57)	9.8 (0.90)	6.0 (0.72)	4.5 (1.39)	3.2 (0.87)
Social sciences[b]	11.0 (0.66)	15.7 (0.92)	6.3 (0.72)	9.9 (1.05)	8.7 (2.06)	10.5 (3.01)
Office, trades, etc.[c]	2.6 (0.35)	0.8 (0.17)	8.0 (1.01)	9.2 (1.06)	12.2 (2.41)	22.5 (2.91)
Other, undecided	19.0 (0.87)	20.1 (0.87)	19.5 (1.15)	22.9 (1.40)	22.8 (3.13)	35.3 (3.30)

[a] The acronym stands for Science, Technology, Engineering, and Mathematics.
[b] Includes psychology and communications in addition to anthropology, history, geography, economics, sociology, and a variety of multidisciplines.
[c] Includes business support, construction trades, precision production, transportation, technical drafting, commercial art, and personal services.
NOTES: Standard errors are in parentheses. Columns may not add to 100.0 percent due to rounding. Weighted Ns: class of 1982 = 1.52M; class of 1992 =1.89M.
SOURCES: National Center for Education Statistics: High School and Beyond/Sophomore Cohort (NCES 2000-194); NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

Of all the precollegiate variables through the point of entry to postsecondary education, are there any configurations that stand out in explaining why a student might start in a community college?

This question sounds like a case for a logistic construction, that is, one based on a dichotomous dependent variable: either one starts in a community college or one doesn't. The question is not that simple because in the category of those who do *not* start in a community college lie students who begin in elite four-year colleges and those who start in trade schools offering less-than-one-year certificates, let alone those whose postsecondary careers commence in not-for-profit and for-profit institutions that offer associate degrees. So the group that does not start in a community college is too heterogenous to help explain who *does* start in community colleges. For purposes of a logistic explanation, we tighten the dependent variable by confining the universe to those who start in community colleges and those who start in four-year colleges. For the class of 1992, this decision eliminates 4.8 percent of those who entered postsecondary education (see table 10 above). Given a traditional-age population, we tighten even further by including only those who received either a standard high school diploma, a GED, or an alternative high school diploma within 6.5 years of the modal high school graduation date for the NELS:88/2000 cohort (in other words, by December1998), and who entered postsecondary education by December 2000.

The logistic regression that involves the major precollegiate, demographic, and geographic origin variables tells us that five major variables are negatively related to starting in a community college. All of these variables are statistically significant in the equation, and are highlighted in bold in table 17. Let us take each variable in descending order of the Delta-p values, which tell the story:

> **No delay** is a dichotomous variable that draws a line seven months after the student's high school graduation date. If the student entered a postsecondary institution up to that time, the student did not delay entry. For students who do not delay entry, the probability of starting in a community college (versus a four-year college) drops by 13.1 percent.
>
> **Education expectations**, a three-step variable built from pairs of responses to questions asked in grade 10 and in grade 12, describes the level and consistency of a student's degree goals. For purposes of multivariate analysis, the three levels were divided as follows: (1) consistently expected to earn a bachelor's degree; (2) raised expectations to the bachelor's degree between grades 10 and 12; and (3) either lowered expectations from the bachelor's level between grades 10 and 12 or never expected to earn a bachelor's degree. The result is still a categorical variable, but the reference point—expectations for earning a bachelor's degree—is constant in all three values. With each upward step, the probability that a student was likely to begin a postsecondary career at a community college declines by 12.1 percent.
>
> **Highest high school mathematics** is a five-level variable: calculus, precalculus, trigonometry, algebra 2, less-than-algebra 2. There is some covariance between this variable and the Academic Resources variable, since the highest level of high school math is one of the components of the curriculum component of that measure. Nonetheless, in the context of this equation, it says that with each step up the math ladder,

the probability that a student is likely to start in a community college declines by 8.7 percent.

Academic Resources is a quintile rendering of the student's secondary school academic curriculum intensity, class rank/GPA, and senior year test score (from a 90 minute mini enhanced SAT). The logistic account says that for each step up the quintile, the probability that a student is likely to start in a community college declines by 8 percent.

Socioeconomic status (SES) quintile: with each progressively higher quintile, the probability that a student is likely to start in a community college declines by 6.9 percent.

The only two other variables in the equation to evidence any degree of statistical significance have a positive regression coefficient: whether or not the student indicated an intent to major in an occupationally oriented field (such as health services, trades, office occupations, precision production, or personal services) and whether the student came from a suburban high school. Students were 6.6 percent more likely to begin their postsecondary careers in a community college if they came from suburban high schools (as opposed to urban and rural high schools), but the statistical significance of this variable at .10 in a two-tailed test with eight degrees of freedom, is weak.

Table 17. Logistic account of variables associated with the community college as first institution of attendance for 1992 12th-graders.

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Odds ratio	Delta-p
Intercept	5.0055	0.3186	10.99	.0001	——	
Education expectations	**-0.5149**	**0.0558**	**-6.23**	**.001**	**0.60**	**-0.121**
No delay of entry	**-0.5564**	**0.1553**	**-2.51**	**.05**	**0.57**	**-0.131**
Highest math in high school	**-0.3692**	**0.0593**	**-4.35**	**.01**	**0.69**	**-0.087**
Academic Resources	**-0.3413**	**0.0589**	**-4.05**	**.01**	**0.71**	**-0.080**
SES quintile	**-0.2934**	**0.0482**	**-4.26**	**.01**	**0.75**	**-0.069**
Occupational major	**0.7902**	**0.1426**	**3.37**	**.01**	**2.20**	**0.186**
Suburban high school	0.2828	0.1012	1.95	.10[a]	1.33	0.066
Latino/American Indian	0.2204	0.1722	0.90	——	1.25	
First generation	-0.1599	0.1441	-0.78	——	0.85	

[a] Weak level of significance. See discussion in text.
NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by design effect = 1.43. $G^2 = 6993.2$; $df = 5337$; $G^2/df = 1.310$; $X^2(8) = 1829.74$; $p = .0001$. Percent of concordant probabilities predicted: 83.9.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Suburban areas house 28 percent of community colleges[26] but were home to 43 percent of the 1992 12th-graders who are the primary subjects of this study. Unless we knew more about the capacity of the community colleges in the specific suburban areas from which these students came, and capacity in relation to student backgrounds and postsecondary choice behavior, it is difficult to advance an explanation. Given its marginal inclusion in the model, the suburban variable is most likely a blind alley of analysis**.**

Intent to major in an occupationally oriented field, however, is the strongest variable on the block, so to speak, in this construction of the determinants of starting in a community college among those in the class of 1992 who entered postsecondary education. For this dichotomous variable, the Delta-p statistic indicates that the probability of starting in a community college, as opposed to a four-year college, increases by 18.6 percent for occupationally oriented students. One common sense reason for the strength of this variable is that degree programs in some of the occupational fields, e.g., construction trades, practical nursing, fire control and safety, are simply not offered in four-year colleges. Too, all of these fields have considerable local visibility under the community college workforce development mission.

This feature of the choice behavior of traditional-age postsecondary students will be taken up again when we describe the relative degree of dominance of the community college in the full postsecondary histories of the High School Class of 1992. At this point, though, we add a caveat: occupationally oriented students are very attuned to local labor market conditions, and make enrollment decisions accordingly (Betts and McFarland 1996). Guerin (1997) tracked seven entering cohorts (1988–1994) at a New Jersey community college for three years each to determine the effects of economic cycles, not only on initial enrollment, but on stopout, graduation, and transfer rates. The mean age of each of these cohorts was approximately 19, and the proportion of the cohort consisting of new high school graduates ranged from 80–90 percent, so his cohorts are very much akin to those of the NCES grade-cohort longitudinal studies. In an event-history analysis, Guerin (1999) sought to determine the timing of transition from initial school to another status as a function of local unemployment rates, as well as what he called the “pseudo draw rate,” reflecting the initial enrollment rates of recent high school graduates in a community college as a function of economic conditions. What we see in national accounting in terms of the relationship between occupational orientation and enrollment is not necessarily what a local or regional community college experiences. Grubb (1996) would argue that the public image of the community college is—and should be—an occupationally oriented institution and that feature of its landscape has distinct signaling effects to prospective students.

The fact that the race/ethnicity variable (defined to flag as "minority" only the two minority groups that attend community colleges at significantly higher percentages than other race/ethnicity groups, Latinos and American Indians), and the first-generation college status

[26] National Center for Education Statistics, Integrated Postsecondary Education Data System, 2002. The categories combined to produce the suburban figure are "urban fringe of large city," "urban fringe of mid-size city," and "large town."

variable did not meet the minimal threshold criteria for statistical significance in this equation may be disappointing to some analysts, but must be acknowledged.[27]

What we have at the end of the day is a statement that might read: Students with better high school academic performance, a steady commitment to a bachelor's degree, of higher SES quintile, and who enter postsecondary education directly from high school are *not* likely to start out in community colleges, rather in four-year colleges. An inverse set of statements thus holds true as well: Students whose high school academic performance was at best mediocre, who were not consistently (if at all) committed to earning a bachelor's degree, who delayed entry to postsecondary education, who intended to major in an occupationally oriented field, and who came from suburban high schools are more likely to begin their college careers in community colleges (at least compared to starting in a four-year college). The probabilities of each of these factors carry different weights; some are more significant than others; and no one will say that all entering traditional-age community college students carry these features of secondary school history, intentions, or attendance timing.

Addendum to First Portrait:
Other Users of the Community College—Temporary and Reverse Transfers

The first portrait of community college students relies on the metaphor of moving into town, and stops with the metaphor of unpacking the moving van. The students who do this, however numerous, do not comprise the full range of students who attend community colleges during their undergraduate careers. Not everyone who comes to town is moving into an urban space for the first time, and not everyone who comes to town will stay for long. Of all the students from the High School Class of 1992 who attended a community college at any time by December 2000, 73.6 percent (s.e. = 1.18) started in the community college, and 26.4 percent started somewhere else.

In setting up an appropriately deeper account of those students for whom the community college was the dominant postsecondary experience (see Part IV), and an account that looks backward from the attainment of students who started out in community colleges (see Part V), it is necessary to mark that 26.4 percent, and examine them separately.

The points made by this addendum to the first portrait are important in assessing a range of distorting images of community college students. If, in the same denominator, one lumps *ad hoc* enrollees (and there is more than one category of these) with those who not only start out at community colleges, but who earn credentials from community colleges, transfer to four-year

---

[27]There are significant demographic background differences between first-generation students and others in the NELS:88/2000 data base, and these are much the same as found by Terenzini et al. (1996) in a sample of entering students at 18 four-year colleges and five community colleges: higher percentages of under-represented minorities, lower SES profiles; and lower education expectations. In a logistic account of determinants of starting in a community college, however, SES quintile and education expectations, by themselves, contributed to pushing first-generation status out of the model.

colleges, or both, one denies the differential histories of community college students (Bach et al. 2000). One attenuates the judgment of success, and diffuses the account to such an extent that it is impossible to focus on those community college students who might have succeeded but did not, hence to hypothesize strategies that would enable them to acquire credentials or transfer.

Kane and Rouse (1999), for example, claim that "community college students typically do not complete many college credits" (p. 68). Their evidence, based on the High School and Beyond/Sophomore Cohort (High School Class of 1982 followed for 11 years on transcripts to 1993), is displayed in a distribution of credits earned by students who earned *any* credits from community colleges. A replication of this distribution is set forth in table 18. The replication adds the critical condition of *starting* in a community college. This condition yields a different distribution at the lowest and highest credit bands.

The universe defined by Kane and Rouse includes, among others, four-year college students who used the community college for incidental purposes. In fact, 10 percent of the High School and Beyond/Sophomore Cohort students who started in four-year colleges and earned more than 15 credits from four-year colleges, also earned 1–15 credits from community colleges. To be fair to community colleges, these people should not be in the universe of judgment of how many credits "community college" students earn. Both Dellow and Romano (2002) and Townshend and Deaver (1999) describe them as temporary transfers. Most of them are excluded by adding the criterion of the community college as first institution of attendance. When the denominator changes in this manner, the proportion of incidental students drops from 35 percent to 27 percent, and the proportion of those who earn more than 60 credits rises from 26 to 31 percent.

Table 18. Distribution of credits earned in community colleges for the high school class of 1982 as presented by Kane and Rouse (1999) compared with the same distribution adding the condition of starting in a community college

Number of credits earned[a]	Credits earned by students who earned any credits in community colleges: High School and Beyond/Sophomore Cohort, 1982-1993	
	Percent of students who earned any community college credits[b]	Percent of the same students, adding condition of starting in a community college
0.1 - 15	35.3	26.5 (1.14)
15.1 - 30	16.2	17.2 (0.99)
30.1 - 45	11.4	13.1 (0.84)
45.1 - 60	10.8	12.2 (0.81)
More than 60	26.3	31.0 (1.16)

[a] The credit bands correspond to Kane and Rouse's semester metric.
[b] As reported by Kane and Rouse (1999).
NOTES: Standard errors for the replication are in parentheses. Column for the replication may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: High School and Beyond/Sophomore Cohort Postsecondary Transcript Files (NCES 2000-194).

"Temporary transfers" from four-year colleges is too limited a description of the intersectoral swirling of students who use community colleges from other institutional bases. Table 19 invokes the histories of the High School Class of 1992 (the NELS:88/2000), expands the boundaries of the universe to all of those who started elsewhere and used the community college, and identifies four attendance patterns that challenge community college enrollment managers because, while most of these students start in another place, they spend different periods of time in town, and for different reasons. From the community college perspective, it is difficult to predict when and how a student from a four-year college will enroll. Yes, the temporary transfers are a plurality in this universe (they are called "four-year drop-ins" in table 19); the vast majority of them earned 10 or fewer credits at the community college, and their bachelor's degree attainment rate—at 87 percent !!—was at least 20 percentage points *higher* than that for four-year college students who did not earn any community college credits.

In terms of intensity of use of the community college, we also find the four-year drop-in who became more than an incidental user of community colleges through a pattern of alternating enrollment. Thirty-two percent of this "alternating 4/2/4" group bounced back and forth between the four-year college and the community college more than once. About half of all alternating enrollment students who started in a four-year college earned at least a year's worth of credits (30 or more) from community colleges, and more than half ultimately earned a bachelor's degree, though their rate of attainment was at least 10 percentage points *lower* than that for four-year college students who never attended community colleges in whatever pattern. On arrival at the community college they appear to be reverse transfers, but, as Hagedorn and Castro (1999) found in interviews with community college students who had started elsewhere, those of traditional-age fully intended to return to the four-year institution (older students did not). This distinction prompts us to pay special attention to the reverse-transfer group.

Table 19. Percent of 1992 12th-graders who attended community colleges but did not start in community colleges, by attendance pattern, number of credits earned at community colleges, and bachelor's degree attainment

Attendance patterns and percent of students		Number of credits earned at community colleges				**Percent earning bachelor's degree**
		0	1-10	11-29	30+	
Reverse transfers	25.4 (2.46)	#	28.5 (5.62)	28.9 (4.58)	42.6 (5.24)	**1.2 (0.62)**
Four-year drop-ins	41.8 (2.56)	#	82.1 (2.59)	14.4 (1.94)	2.7 (1.86)	**87.4 (1.57)**
Alternating 4/2/4	27.7 (2.04)	5.4 (1.03)	4.2 (1.11)	38.6 (3.89)	51.6 (4.07)	**55.9 (4.11)**
Other patterns[a]	5.1 (1.03)	4.5 (1.40)	54.3 (5.59)	21.4 (3.96)	19.8 (3.52)	**3.0 (0.94)**

Rounds to zero.

[a] The small percentage (5.1) of students in other attendance patterns were based principally in trade schools and other sub-baccalaureate institutions. A plurality (47.6 percent; s.e.= 4.56) earned certificates as their highest degree.

NOTES: Standard errors are in parentheses. Column for attendance pattern distribution and rows for number of credits earned at community colleges may not add to 100.0 percent due to rounding.

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecond Transcript File (NCES 2003-402).

Reverse Transfers

Among 1992 12th-graders who continued to postsecondary education, undergraduate reverse transfer students accounted for 7.8 percent (s.e. = 0.79) of those who began in four-year colleges, and 7.3 percent (s.e.= 0.73) of those who ever attended community colleges. The undergraduate reverse transfer student presents a different analytical challenge because the terminal degree for the reverse transfer should be the associate, not the bachelor's.[28] The record of the NELS:88/2000 reverse transfers in this regard is not encouraging: only 16.8 percent (s.e. = 2.57) earned an associate degree. The principal driver behind this disappointing outcome appears to be academic performance: nearly 90 percent of reverse transfers started out in nonselective four-year colleges and achieved a mean GPA of 1.91 (S.D. = .80) and a mean of 18 additive credits (S.D. = 9.3) in their first calendar year of attendance at the four-year college. The timing of their reverse transfer suggests that despite poor first-year performance in the four-year institution, a majority persisted in that environment for at least another year: 18 percent transferred to the community college within one year of entry to the four-year; another 26 percent transferred within two years; but 56 percent transferred three or more years after the first term of attendance at the four-year institution.[29] For those who remained at the four-year institution through two calendar years, the mean GPA also remained below par at 1.90 (S.D. = .81), and the second year improved the mean additive credit count only to 28.7 (s.e. = 2.32).

While McCormick (1997) showed similar GPA relationships among reverse transfer students in the five-year Beginning Postsecondary Students Longitudinal Study of 1989/90, institutional studies cited by Townshend and Deaver (1999) present a mixed account of the role of grades in the move from a four-year environment to the community college.

Even if undergraduate reverse transfers constituted only 7 percent of the members of the High School Class of 1992 who had attended community colleges by the end of 2000, they entered into the regular stream of enrollment management, became residents of the town and are a group for whom the community college assumes responsibility (Townshend and Deaver 1999). Of the four groups of temporary transfers delineated above, they require a brief review of backgrounds and histories, particularly in light of their low rate of attainment. Demographically, reverse transfer students are closer in profile to community college entrants than they are to other students who started in four-year colleges only by first-generation college status. They evidence a lower socioeconomic status quintile distribution than both community college entrants and other four-year college entrants, but received grants and scholarships during their first two years of postsecondary education at a rate similar to that of other four-year college entrants. In terms of high school background, their academic performance—measured by highest level of mathematics attained, class rank/GPA quintile, 12th grade test score, and academic curriculum intensity quintile—is, in general, halfway between the marks of those who started in community colleges and those who started in four-year colleges (see table C-11, Appendix C, for documentation of all these data). In other words, they are an academically weaker group on entrance to four-year colleges than their peers, but stronger than the typical community college entrant.

---

[28]The reverse-transfer student is an undergraduate. Students who attend a community college *after* earning a bachelor's degree are post-baccalaureate students, not reverse transfers.

[29]Nearly 75 percent stopped out for more than one semester, which partly explains the gap between the first term of enrollment at the four-year college and the first term at the community college.

More relevant to the point at which community colleges pick up potential reverse transfers on their enrollment radar screens are key features of these students' postsecondary academic history, and table 20 presents a selection.

On balance, the reverse transfers of the High School Class of 1992 continued to display relative academic weakness in both entrance and post-matriculation records than other students who started in four-year colleges and earned credits from community colleges. The tell-tale signs involve two attendance pattern phenomena: delay of entry and non-continuous enrollment; and these are accompanied by high rates of remediation and high rates of course withdrawal and repeats in the first calendar year of postsecondary attendance. In terms of mean GPA, reverse transfer students performed better in the community college (2.71, s.e.= 1.00) than in the four-year college (1.75, s.e. = 1.03), but that doesn't seem to have helped degree completion of any kind. LeBard (1999) cites a few special programs designed by community colleges and parent reverse transfer "feeder" institutions to address student needs and goals, and this seems to be a promising approach provided that the four-year college partner is both monitoring and advising potential reverse transfers at early stages of their college careers and conveying that information to the special program office at the community college well before the student arrives.

Table 20. Education expectations and academic behaviors of 1992 12th-graders who became reverse-transfer students, compared to other students who started in four-year colleges and community colleges and earned any credits from community colleges

Expectations and behaviors	Reverse transfers	Others who started in four-year colleges	Others who started in community colleges
Consistent expectations for bachelor's in grades 10 and 12	59.1 (5.85)	71.9 (2.72)	38.8 (1.71)
No delay of entry	81.4 (5.26)	96.7 (0.74)	74.4 (1.58)
Any remedial reading	14.5 (5.30)	3.7 (0.67)	17.3 (1.45)
No remedial math	63.8 (5.76)	81.5 (2.64)	53.9 (1.78)
No remedial courses	53.1 (5.74)	71.9 (2.72)	39.7 (1.76)
Course withdrawals and repeats in the first calendar year			
None	36.3 (4.74)	62.2 (2.48)	45.9 (1.75)
One or two	48.0 (5.96)	31.6 (2.40)	36.6 (1.63)
More than two	15.6 (4.24)	6.2 (0.90)	17.4 (1.37)
Continuously enrolled	38.2 (5.74)	80.8 (2.08)	54.3 (1.70)

NOTES: Standard errors are in parentheses. Weighted Ns: Reverse transfers = 76k; four-year beginners who also earned credits from community colleges = 219k; community college beginners who also earned credits from community colleges = 735k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402 and Supplement).

Types of Incidental and *ad hoc* Attendance

Incidental and *ad hoc* participation is another challenge to enrollment management in open-door public institutions. Students come at the community college from many points in time and space: directly from high school, from high school but after considerable delay, from four-year colleges as reverse transfer students, from four-year colleges in alternating enrollment patterns, from other sub-baccalaureate institutions, and in terms in which the student is enrolled simultaneously in more than one type of school. Residents of a town, temporary or long-term, travel to adjacent (and even distant) settlements to obtain services analogous or even identical to those available locally. These excursions may be particularly frequent and intense in urban and metropolitan areas (Bach et al. 2000; Li and Gutierrez 2004), and the direction is certainly not linear (Piland 1995; Maxwell et al. 2002). Bach et al. (2000) found 48 discrete patterns of attendance involving community colleges, public four-year colleges, and other types of postsecondary institutions in the Portland, OR urban area,[30] and the finding is probably not atypical.

To identify more accurately the different types of *ad hoc* community college students, we will lift the restrictions we have placed on the denominator by dropping the requirement that the student begin in a community college. All told, 32.7 percent of 1992 12th-graders who *ever* attended a community college earned 10 or fewer community college credits, and can be flagged as incidental or *ad hoc* community college students. How do we know what *kind* of incidental or *ad hoc* students they were? Principally by looking at the combination of institutional types they attended. Table 21 details the results.

Of the eight institutional combination and sequence patterns cited in table 21, five are dominated by a four-year college experience, with students starting in or based in four-year colleges, yet choosing to use the community college on an incidental basis.[31] As a flexible, open-door institution, the community college will inevitably serve them, yet its responsibility for the student's fate in these cases is secondary to that of the four-year sector.

The largest group of students in table 21, though, never studied anywhere but at a community college. They illustrate a variety of ways that students earn 10 or fewer credits. The following are *not* mutually exclusive reasons: (1) half of them did not even *attempt* more than 10 credits of course work; (2) 45 percent received enough penalty grades to hold their credit count at 10 or less; (3) nearly 30 percent took virtually nothing but remedial courses that do not carry additive credits; (4) 17 percent were enrolled in short-term occupational programs; and (5) a small group confined themselves to continuing education courses only. Not all of these features of course work represent failures to negotiate the environment, but the post-matriculation evidence suggests that, on balance, incidental students based wholly in community colleges arrived in town with insufficient skills to take advantage of its economy.

---

[30]Seven of these patterns accounted for 81 percent of the cases in the Bach et al. study.

[31]To gain an understanding of what these four-year students come to the community college to study on an incidental basis, see table C-3 in Appendix C. For confirmatory evidence, see Hagedorn and Castro (1999).

Table 21. Of 1992 12th-graders who attended a community college at any time and earned 10 or fewer credits (including zero credits) from community colleges, distribution of types of institutions attended

Combinations of institutions attended	Percent of all incidental community college students	Mean community college credits	Comment
Four-year college only	3.4	1.49 (.220)	These students had a single, fragmentary encounter with a community college.
Reverse transfer	6.2	3.48 (.436)	These students moved from a four-year to a community college, but became incidental students at the community college.
Community college to four-year	4.6	2.66 (.437)	These are transfer students who "touched base" with the community college—but no more than that—before moving on to a four-year college.
Alternating attendance between community college and four-year	2.3	4.12 (.609)	In the course of alternating, these students earned minimal credits from the community college.
Based in four-year; use community colleges for for minor course work	23.6	4.57 (.609)	Most of these students used community colleges during summer terms, and more than once.
Community college only	51.7	2.94 (.203)	Of this large group, 29 percent (s.e.=2.92) carried records of course work that were overwhelmingly remedial, hence earned few or no additive credits; 17 percent (s.e.=2.15) were in short-term vocational programs; and 45 percent (s.e.= 3.21) simply failed too many courses to accumulate more than 10 credits (the mean GPA for this group was 1.91; S.D. = 1.14). The balance were continuing education students.
Community college and other sub-baccalaureate school	6.5	3.70 (.361)	The sub-baccalaureate school was the dominant institution in these histories.
Community college, four-year, and sub-baccalaureate institutions	1.7	4.76 (.133)	Of these three types of institutions, the community college weighed less in the student's academic history

NOTES: Standard errors are in parentheses. Column for percent of all incidental students may not add to 100.0 percent due to rounding. Weighted N for the full universe = 485k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

There are those who move into town for a short period of time, and there are those who stay and participate in the life of the community, sustaining and validating its economy, and serving as resources of information for those who subsequently arrive at the head of the "stranger's path." Who are the longer-term residents, and why is their portrait particularly revealing? The following section of this essay sets forth and assesses the defining features of this important segment of the community college population.

-IV-
Second Portrait: The Community College Residence Trichotomy

Summary

This section of the data essay focuses on students who spend a substantial portion of their postsecondary careers in community colleges. The richer the student's history the more we learn of what the community college really does. The students whose histories are emphasized in this section provide a stable reference point for programming, course offerings, staffing, and facility utilization. The threshold for entry into this analytical universe is 30 additive credits earned in community colleges; the average number of community college credits earned by the 1992 12th-graders who are our subjects was 62.

The essay first demonstrates the comparative course-taking rates of those who transferred and earned bachelor's degrees and those who did not as a prelude to the analysis. An example of what we learn from this prelude: there were no differences between the groups in participation rates in computer science and computer applications, accounting, graphics and design, biology service courses, health services, and nutrition. All these course categories are connected to occupationally oriented programs that can lead to certificates and associate degrees as well as bachelor's degrees**.**

The universe of traditional-age students who started in community colleges is then divided into three groups according to relative commitment to residence in the town by a combination of community college credits and ratio of community college credits to all undergraduate credits earned:

> **"Homeowners**": constituted **37** percent of the traditional-age group. They earned at least 30 community college credits, and 60 percent or more of all their undergraduate credits from community colleges.
>
> **"Tenants**": constituted **18** percent of the universe. They earned at least 30 community college credits, but less than 60 percent of all their undergraduate credits were earned at community colleges.
>
> "**Visitors**": accounted for the remaining **45** percent. While they all started out in community colleges, they earned at least one but less than 30 credits from community colleges.

These categories are initially just outlines. In the process of filling in the outlines, we identify features of academic behaviors starting in high school that deserve statistical testing in light of what turn out to be the most important outcomes by which community college core missions to traditional-age students can be judged: (1) transfer to a four-year institution and (2) terminal associate degree, each of which becomes the dependent variable in logistic accounts.

Two challenges for community college enrollment management and advisement emerge from the analysis: identifying the characteristics of Visitors that can be leveraged to help them become longer-term

residents; and isolating the elements of the degree completion gap witnessed among the longer-term residents we call Homeowners, who are more oriented toward occupational degree programs. One of those elements is the ratio of occupationally oriented credits to all undergraduate credits earned: when the ratio rises above 65 percent, degree completion rates fall, implying that a better balance of arts and sciences course work is called for to improve degree completion rates.

When we compare the three residence history groups in terms of potential independent variables in the logistic models, there are *no differences* in remedial course work in the first calendar year of attendance. In fact, there were no differences in remedial course-taking in *mathematics* between those who transferred and earned bachelor's degrees and those who started in community colleges, earned 30 or more credits from community colleges, and either did not transfer or transferred and had not earned a bachelor's degree by December 2000.

These data suggest that community colleges are bringing a significant proportion of remedial students successfully through that hurdle, and that remedial mathematics is not necessarily a hindrance to bachelor's degree attainment for those who start out in community colleges.

Variables evidencing differences among the three residence history groups (but not significant in multivariate analyses of transfer and associate degree completion) include: first-year GPA, dual-enrollment credits and credit-by-examination, number of science credits earned in the first calendar year of community college attendance, use of grants, loans, and formal college work-study in financing higher education, and education expectations.

The variables that show positive impact in logistic models of both transfer and terminal associate degree attainment are:

- entering the community college directly from high school
- more than 4 credits in college-level mathematics
- more than 4 credits earned during summer terms
- continuous enrollment

The variable with negative impact in both models marks cases in which 20 percent of all grades received were no-penalty withdrawals or no-credit course repeats. Holding a campus job during the first two years of community college attendance also demonstrated a positive relationship to associate degree completion (but not transfer). In*ter*state attendance is a surprisingly strong contributor to transfer.

Nearly all of the variables associated with transfer and associate degree attainment are academic momentum variables. The momentum toward college-level mathematics credits can be traced back to secondary school, and argues for creative outreach efforts that will bring high school students to and, preferably, one step beyond algebra 2. Community colleges might aid both their students and institutional outcomes data by revisiting grading policy vis-a-vis withdrawals and repeats within the context of student credit load.

The literature on community college student histories is so overwhelmingly focused on either noncompletions or incidentalism (e.g., Grosset 1993; Roueche and Roueche 1994) or labor market outcomes largely confined to earnings (e.g., Kane and Rouse 1995; Leigh and Gill 1997) that we miss everything in-between. Transfer, particularly complex transfer paths (e.g., Porter, Hogan and Gebel 2000) and remediation (e.g., Hoyt 1999a), as topics of investigation, are exceptions. The reader of the literature has very little idea of what community college students study, the components and sequences of their attendance, and the measures of their performance other than first-year GPAs—let alone the ways in which these features of their paths come together in their post-community college lives in four-year colleges and in the labor market. Yet elements of student academic history including curricular detail, sequence, and credit generation tell us far more about what community colleges do than dichotomous or skeleton accounts of retention and attainment.

But one cannot access and analyze the richness of variables accompanying the educational mission of the institution unless one isolates a group of students who have spent a significant amount of time and effort in community colleges. The third portrait in this exploration measures time and effort in terms of earned additive credits, and sets a threshold of 30 community college credits in order to obtain meaningful estimates. The 30 credit threshold is empirically derived from the average annual *earned* (not attempted) credit load of bachelor's degree recipients in the NELS:88/2000 longitudinal study. "Annual" includes summer terms, but excludes credits-by-examination and dual-enrollment credits earned prior to high school graduation. However, wherever, and whenever earned, 30 semester credits is the equivalent of one full academic year. This equivalent provides temporal space for the student to be involved in the affairs of the town, principally through the community of the classroom (Tinto 1998).

The students with 30 or more community college credits are extraordinarily important to enrollment management at community colleges themselves. With all the ad hocism that logically follows from open-door missions, with all the incidental students coming at the community college from different directions (dual-enrollment high school students, four-year college summer school students, occasional alternating enrollment students, let alone the continuing education and noncredit students), the students who spend a large portion of their credit-time at community colleges provide a stable reference point for programming, course offerings, staffing, and facility utilization. They become homeowners and tenants with long-term leases, and they do not constitute a small group. From the population of 12th-graders of 1992 alone, those who started in community colleges and earned at least 30 credits from community colleges by December 2000 numbered 410,000—or 51 percent of all 1992 12th-graders whose first institution of attendance was a community college. Put another way: Half of the traditional-age students who start out in community colleges will write a substantial history in community colleges, and the content of their time bears close attention. In this vein, the transcript evidence is as close to a "time diary" (Robinson 1999) as we can approximate for the task of documenting their history.

Prelude: The Content of Time and Effort

As a basic illustration of what we can learn when we admit into the analytical universe only those students who earned 30 or more credits from community colleges, consider course-taking as a prelude to understanding what long-term residence means. Students do not come to an institution of higher education simply to walk around; they come to learn something, and the transcript data begin to tell us something of what they studied, what offerings of the core economy of the town they at least sampled as consumers. Transcript data differ from those of other studies of community college curricula (Cohen and Ignash 1994; Palmer 1999; Brawer 1999) in that they indicate course completions, not proxies such as course offerings or numbers of scheduled sections of particular courses, or even course enrollments (Schuyler 1999).[32]

The table on which the text here comments is extensive, and presented as table D-1 in Appendix D. The table takes all students from the High School Class of 1992 who started out in a community college and earned 30 or more credits from community colleges, and divides them into two groups: those who ultimately (by December 2000) earned less than a bachelor's degree (whether or not they transferred to a four-year institution) and those who earned bachelor's degrees (who obviously transferred). It compares the two groups in terms of the percentage of students earning any credits in 78 aggregate course categories[33] and indicates where the differences in the estimates are statistically significant.

What we see in comparing the two groups of community college students includes both the expected and the intriguing. To help us judge the differences between these two groups, we should note that students who earned less than a bachelor's degree accumulated an average of 62 credits from community colleges and 11 credits from four-year colleges, while the matching figures for those who transferred and earned bachelor's degrees are 63 credits from community colleges and 81 credits from four-year colleges. The transfer-bachelor's degree group's course-taking records thus will evidence the greater diversity of four-year college programs.

- Transfer students who completed bachelor's degrees had significantly higher rates of participation in college-level mathematics and statistics courses as well as in all humanities, social science, performing arts, and core laboratory science categories. For example, 39 percent of the transfer-bachelor's earned credits in statistics

[32]Course enrollment data do not represent students since the same student can enroll in the same course category more than once in an academic accounting year. And obviously enrollments say nothing about completion.

[33]There are 1,178 course categories in the *Taxonomy of Postsecondary Courses Based on the National Transcript Samples, 2003* (available at http://www.ed.gov/rschstat/research/pubs/empircurr/index.html). An aggregate combines these categories, e.g. "Accounting" includes introductory accounting, tax accounting, cost accounting, auditing, fund accounting, Certified Public Accountant (CPA) review, and accounting information systems. For purposes of this calculation a student who earned one credit in computer programming, for example, carries the same weight as a computer science major with a dozen credits in C language, object-oriented languages (C++, Java, Visual Basic), and Algebraic language programming.

versus 12 percent of those who earned less than a bachelor's degree; 58 percent of the transfer-bachelor's earned credits in general biology versus 32 percent of those who earned less than a bachelor's. These aggregates cover many general education distribution options which are usually required for both the transfer-oriented associate of arts (or sciences) degrees and the bachelor's degree.

- There were no differences between the groups in participation rates in computer science (18 percent of the transfer-bachelor's and 14 percent for those who earned lesser credentials), computer applications (43 percent for both groups), accounting (28 percent of the transfer-bachelor's versus 25 percent), graphics and design (13 percent for both groups), biology service courses (18 percent versus 14 percent), health services (24 percent versus 26 percent), and nutrition (13 percent versus 11 percent). All of these categories are connected to occupationally oriented programs that can lead to the sub-baccalaureate credentials of certificates and associate degrees as well as bachelor's degrees.

- Community college students who earned less than a bachelor's degree, including those who earned no degree, evidenced higher participation rates in the categories encompassing financial service support, office occupations, "mathematics: other" (a category dominated by technical mathematics courses), and remedial English.

- The comparative participation rates in business fields illustrate the influence of four-year college curricular offerings, with those who earned bachelor's degrees showing higher course completion percentages in specialized areas of finance, marketing, and business information systems. At the same time, there are no differences between the groups in accounting and "other" business courses (a category that includes general management, operations management, personnel management, organizational behavior, labor/industrial relations, and others).

That there is no difference in the large percentages of the two community college groups who completed course work in precollegiate mathematics—53 percent of the transfer-bachelor's versus 57 percent of those who earned lesser (if any) credentials—suggests that this type of remedial work, while widespread in community college settings, by itself is not an impediment to earning a bachelor's degree (see pp. 112-116 below).

This strain of curricular analysis would not be credible if community college students with less than a year's worth of community college credits were included. It encourages us to look more closely at the academic histories of these students, for if the completion of credentials—a key measure of sector accountability—can be enhanced, the students who can guide us are those with sufficient academic momentum, and the 30-credit line is an indicator of that momentum.

Homeowners, Tenants, and Visitors

The prelude to this section of the essay addressed all students who started in community colleges and earned 30 or more credits from community colleges, divided them by the marker of earning a bachelor's degree, and did so for purposes of illustrating curriculum differentials.

But the second portrait of community college students is one of residential history. To identify a body of students who first moved to and spent a substantial amount of time in the town of the community college, credits are used as the proxy for time. From the endpoint of their undergraduate histories, we want to divide this group, in turn, by its relative commitment to residence in the town. So while the 30 credit threshold is invoked, to it is added a critical criterion: the proportion of all undergraduate credits attempted that were earned in community colleges.

The true community-college dominant student, the long-term resident of the town, not only earns 30 or more credits from community colleges, but 60 percent or more of all the student's undergraduate credits came from community colleges. The 60 percent threshold to describe students who "belong" to community colleges was based on a preliminary examination of credits and credit-ratios set forth in table 22, along with allied data.[34]

The vast majority of the students who earned 30 or more community college credits also averaged more than 60 credits from community colleges, and for a considerable majority (62.4 percent) the community college accounted for 60 percent or more of all undergraduate credits earned. Most of those who earned less than 60 percent of their undergraduate credits from community colleges did so because they were transfers to four-year colleges who ultimately earned bachelor's degrees. When we bring back into the picture those students who started in a community college and earned more than zero but less than 30 credits, the universe is tripartite, and its basic division is set forth in table 23.

[34]In the course of that examination, the question was asked, "If one plots two sloped lines for students with complete records who started at community colleges and earned 30 or more credits from community colleges—one line for total undergraduate credits earned by enrollment and one for the ratio of community college credits to total undergraduate credits—and marks the *theoretical* minimal point for bachelor's degree recipients at 120 undergraduate credits by enrollment, what is the value of the community college credit ratio at that point?" Answer: 59th percentile. If one marks the *empirical* minimal point of total undergraduate credits earned for bachelor's degree recipients in the NELS:88/2000 sample, 110 credits, the ratio of community college credits to all undergraduate credits is 61 percent at that point. The heuristic of "60 percent or more" thus seems appropriate.

Table 22. Of 1992 12th-graders whose first institution was a community college and earned 30 or more credits from community colleges, distribution by the ratio of community college credits to *all* undergraduate credits, average credits earned in community colleges, and average total undergraduate credits earned

Ratio of community college credits to all undergraduate credits earned	Percent distribution by proportion of community college credits	Average credits earned from community colleges	Average total undergraduate credits earned
1 - 29 percent	5.4 (1.35)	35.9 (0.489)	139.6 (4.035)
30 - 59 percent	32.2 (1.98)	63.3 (0.978)	136.5 (1.681)
60 - 89 percent	12.7 (1.56)	73.0 (2.932)	100.7 (4.318)
90 percent or more	49.7 (2.12)	63.4 (1.343)	62.5 (1.358)

NOTES: Standard errors are in parentheses. Weighted N = 412k. Column for distribution may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

This residential trichotomy is a very rich universe for exploration of academic histories of community college students. The credit thresholds are sufficient to support comparative accounts of demographic backgrounds, high school academic performance, postsecondary attendance patterns, first postsecondary year performance, remediation, and extended postsecondary curricular participation. The three dimensions of history—time, space, and content—are substantive enough (a) to tell us what community colleges do for traditional-age students who spend more than a modicum of time with the institution, and (b) to suggest both the paths through which otherwise minor participants can become major participants and the leverage points of academic momentum that are positively associated with earning credentials.

The labels we have assigned the three groups describe the type of economic contract implicit in their residential relationship with the town:

- Homeowners–they have made an investment in the place and spend the majority of their time and effort in the place They can sell the house and move to another town (transfer), but most of them are place-bound. These are the students who started in community colleges, and earned 30 or more credits and more than 60 percent of all undergraduate credits from community colleges.

- Tenants with longer-term contracts–they invest a plurality (but not majority) of their time and effort in the economy of the town. They have fewer impediments to moving, and most of them do, in fact, transfer. These are the students who started in community colleges, and earned 30 or more credits but less than 60 percent of all undergraduate credits from community colleges.

- Visitors–they are shorter-term renters. For the most part, when they leave town, they leave the system. These are students who started in community colleges, and earned at least one but less than 30 credits from community colleges.

For all three groups what we see initially are skeletons of completed history, outlines formed only by credits earned at community colleges and (for two of the groups) the ratio of community college credits to all undergraduate credits. These are not outcomes. The groups are descriptive states, not dependent variables. Before we consider dependent variables, our task is to fill in the outlines, to add both color and depth to the descriptions.

Table 23. Of 1992 12th-graders whose first institution of attendance was a community college and who earned any credits from community college by December 2000, percent distribution by "community college residence" category

Community college residence category	Percent who earned any credits from community colleges and first institution was a community college		Average credits earned from:	
			Community colleges	Four-year colleges
Homeowners (earned 30 or more credits and 60 percent or more of all undergraduate credits from community colleges)	36.9	(1.57)	65.2 (1.24)	9.2 (1.05)
Tenants (earned 30 or more credits but less than 60 percent of all undergraduate credits from community colleges)	17.9	(1.27)	56.5 (1.24)	78.1 (1.56)
Visitors (earned 1-29 credits from community colleges)	45.2	(1.80)	13.6 (0.42)	11.0 (1.76)

NOTES: Standard errors are in parentheses. Weighted Ns: Homeowners = 277k; Tenants = 135k; Visitors = 340k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

The following sections examine this trichotomized group in detail, starting with demographic characteristics and indicators of momentum from secondary school, moving through the first year of attendance, and concluding with the major features of complete academic histories. Given the

the average number of credits earned in community colleges by Homeowners and Tenants (table 23), it is obvious that these students merit considerable attention in enrollment management. What they bring to the town from prior experience, along with their subsequent academic activities, determine which districts of the town thrive, and the level of demand for utilities and services. The choices they make in academic space, time, and sequence, interacting with the institution, constitute "performances" (Halprin 1969). These choices are not set in cement: the town can rearrange space (location of offerings), time (term, as well as day and hour), and sequence (e.g., pre-requisites), and the human interaction with those rearrangements will become a new performance.

Within the basic demography of this trichotomized group as set forth in table 24, there are no differences by gender or by urbanicity of high school community. The Tenants present a higher SES profile than the other two groups, while there are no differences in SES distribution between Homeowners and Visitors. This profile is reflected in the higher percentage of Tenants with at least one parent having earned a bachelor’s degree (and no differences between the Homeowners and Visitors in terms of parents’ highest levels of education).

As for the distribution by race/ethnicity, a higher proportion of the students who earn less than 30 community college credits are minority. Half of both the Latinos and African-Americans in this Visitors group came from urban high schools, a rate almost double that for all students who started in community colleges. While 73 percent of the Latinos in this group entered the community college directly from high school (a rate 10 points higher than the entering community college population writ large), and 70 percent of African-Americans in this group anticipated earning a bachelor’s degree (a rate 10 points higher than all whose first institution was a community college), some 41 percent of both minority groups arrived with a maximum of algebra 1 in their high school mathematics records, a rate 15 points higher than that for their minority peers who earned 30 or more community college credits. Each of these contrasts spells a unique kind of dissonance. While this data essay does not dwell on race/ethnicity as a pivotal factor in the histories of traditional-age community college students (principally because, as will be noted, it does not turn up as a significant independent variable in the logistic regressions invoked), the dissonances in these histories call for further research at the census division level. Why census division? Because the populations starting in and earning fewer than 30 credits from community colleges appear to be concentrated: for Latinos in the Pacific census division and for African-Americans in the South Atlantic census division. To obtain more depth of information about a problem, it is advisable to move closer to the source than a national longitudinal study can reach. Census division by urbanicity of high school is a start.

Precollegiate Factors and Paradoxes of Noncompletion

The demographic features of the three groups are offered principally for the record. They tell us less in the long run about what factors individual institutions and systems can focus on to change student paths and improve performance than does a sequence of academic behaviors that starts in high school.

Table 24. Demographic background characteristics of 1992 12th-graders for whom the community college was the first institution of postsecondary attendance and who earned any credits from community colleges by December 2000, by community college residence category

	Community College Residence Trichotomy		
Demographic factors	Homeowner (Earned 30 or more credits and 60 percent or more of all credits from community colleges)	Tenant (Earned 30 or more credits but less than 60 percent of all credits from community colleges)	Visitor (Earned 1– 29 credits from community colleges)
Gender			
Men	47.1 (2.68)	52.4 (3.43)	50.4 (2.90)
Women	51.9 (2.68)	47.6 (3.43)	49.6 (2.90)
Race/ethnicity			
White	75.7 (2.61)	84.2 (2.31)	66.2 (3.11)
African-American	8.1 (1.96)	3.9 (1.33)	12.4 (2.23)
Latino	11.2 (1.70)	7.2 (1.46)	23.9 (1.24)
Asian	3.5 (1.05)	4.6 (0.95)	5.2 (1.20)
American Indian	1.5 (0.87)	0.1 (0.07)	0.7 (0.25)
Socioeconomic status quintile			
Highest quintile	14.5 (1.75)	28.9 (3.80)	11.5 (1.92)
Second quintile	23.9 (2.22)	28.9 (3.36)	27.9 (2.84)
Third quintile	25.2 (2.15)	20.4 (2.58)	25.2 (2.42)
Fourth quintile	22.7 (2.21)	16.3 (2.28)	19.2 (1.87)
Lowest quintile	13.7 (1.99)	5.4 (1.40)	16.2 (2.16)
Generational status			
First-generation postsecondary	28.5 (2.61)	15.6 (2.06)	31.1 (2.84)
Parents had some postsecondary	50.1 (2.69)	46.6 (3.53)	51.3 (3.00)
At least one parent earned bachelor’s or higher	21.4 (2.00)	37.8 (3.67)	17.6 (2.02)
Urbanicity of high school community			
Urban	21.9 (2.47)	27.2 (3.77)	28.7 (2.93)
Suburban	44.3 (3.08)	45.6 (4.11)	46.3 (3.25)
Rural	33.8 (2.80)	27.1 (3.27)	25.0 (2.32)

NOTES: Standard errors are in parentheses. Columns may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: NELS:88/2000 postsecondary transcript file (NCES 2003-402).

Table 25 is offered for this purpose. The table begins to convey one clear story and guides us toward others. The clear story is that students who eventually constituted the Tenant group had much stronger academic momentum coming forward from high school than their peers who started in community colleges, and were far more consistent in their commitment to earning a bachelor's degree. In a few pages we will use these variables in a multivariate analysis to determine what configurations of academic behaviors, both precollegiate and post matriculation, are most likely to lead to transfer from the community college to a four-year college.

Another line of inquiry to which table 25 guides us involves the unhappy paradox of students who enter community colleges with sufficient academic momentum and high expectations, but who fail to earn degrees—one of the most vexing problems for administrators in any postsecondary setting. For example (although these data are not in the tables), 43 percent of the community college Homeowner students and 45 percent of the Visitor students who entered community colleges with bachelor's degree expectations *and* high school Academic Resources attainment in the top two quintiles, earned no credential within 8.5 years of high school graduation. These are not large groups of students (the combined weighted N for both groups in the NELS:88/2000 data set is approximately 24,000), and it is difficult to mark them for special guidance and monitoring from the time they enter. Very few transferred to four-year schools (10 percent of the Homeowners and 7 percent of the Visitors in this small group), and only one in four was still enrolled at the end of the NELS:88 transcript history in December 2000.

These students don't show the characteristics of potential drop-outs: 70 percent did not require remediation, 86 percent maintained their expectations of earning a bachelor's degree two years after entrance, and 79 percent entered directly from high school. Their mean first-year GPA of 2.72 (S.D. = 0.73) was almost indistinguishable from the 2.76 (S.D. = 0.66) for the comparable group of community college students who *did* earn credentials.

But something obviously happened: only 31 percent were continuously enrolled, and another 16 percent were enrolled for less than one year. When asked why they left school without completing degrees, why they sold the house and left not only the town but the county and region as well, 47 percent (s.e. = 10.3) of the community college Homeowner students cited personal and family reasons and only 7 percent (s.e. = 5.12) cited financial reasons. For the Visitor students, the percentages for these categories were 31 (s.e. = 7.78) and 24 (s.e. = 6.98), respectively. For both groups, roughly one out of four students who left school without a degree cited "mood" and "lifestyle." The only academic process variable that reflects the tone of these reasons for non-completion is that half of these students withdrew from or repeated five or more courses (versus 28 percent of all students who started in community colleges), hence undercutting academic momentum. To amend Tinto's (1987) classic drop-out thesis: course withdrawal is a prelude to separation.

The reasons these students cited for leaving without degrees, along with their comparatively high volume of course withdrawals, are student services and counseling issues that call for local research and program development. The case of these students is cited to confess again that there are pieces of the noncompletion universe that the grade-cohort longitudinal studies cannot reach.

Table 25. Secondary school background characteristics of 1992 12th-graders for whom the community college was the first institution of attendance and who earned any credits from community colleges by December 2000, by community college residence category

High school background factors	Community College Residence Trichotomy: Homeowner (Earned 30 or more credits and 60 percent or more of all credits from community colleges)	Tenant (Earned 30 or more credits but less than 60 percent of all credits from community colleges)	Visitor (Earned 1–29 credits from community colleges)
Highest level of mathematics reached in high school			
Calculus/precalculus	6.7 (1.16)	16.6 (2.32)	4.6 (0.73)
Trigonometry	9.2 (1.62)	17.9 (3.27)	6.4 (1.06)
Algebra 2	38.0 (2.48)	36.8 (3.51)	33.8 (3.19)
Geometry	23.4 (2.30)	21.0 (3.61)	23.3 (2.32)
Algebra 1 or less	22.7 (1.89)	7.8 (1.39)	31.8 (2.89)
Academic Resources[a] quintile			
Highest quintile	3.5 (0.72)	11.0 (1.87)	3.1 (0.31)
Second quintile	15.7 (1.81)	25.4 (3.11)	10.5 (2.07)
Third quintile	28.2 (2.47)	33.1 (4.11)	23.1 (2.86)
Fourth quintile	35.8 (2.66)	22.4 (3.57)	35.3 (3.23)
Lowest quintile	16.8 (1.80)	8.2 (1.55)	28.0 (2.54)
Consistency of level of education expectations in grades 10 and 12			
Bachelor's consistent	39.3 (2.59)	54.3 (3.83)	32.0 (2.82)
Raised to bachelor's	20.2 (1.86)	28.0 (3.71)	23.7 (2.28)
Lowered from bachelor's or consistent "some college"	23.9 (2.18)	14.8 (2.59)	25.7 (2.58)
Raised to "some college"	10.8 (1.62)	2.4 (0.74)	14.2 (1.95)
None beyond high school	5.8 (1.20)	0.4 (0.27)	4.4 (0.78)
Applied to a four-year college by 1992	22.2 (2.48)	29.1 (3.35)	20.3 (2.53)

[a] Academic Resources is a consolidated measure of a student's academic momentum going forward from high school, and consists of academic curriculum intensity quintile (42%), class rank/GPA quintile (33%), and senior year test quintile (25%). These percentages were derived from the relationship of the standardized beta coefficients of the three measures in a logistic regression with bachelor's degree completion as the dependent variable. Only those students whose records contain all three of the component measures are included.
NOTES: Standard errors are in parentheses. Columns may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

The First True Calendar Year

The next set of student behaviors that can be traced in the NELS:88/2000 histories and that are critical to identifying points of intervention to increase the odds of degree attainment for the populations under consideration are those occurring between high school graduation and the end of the first calendar year of postsecondary attendance—no matter when that calendar year began (Astin 1993; Pascarella and Terenzini 1991). Table 26 sets forth the major variables for this portion of the comparative portraits, some of which will be invoked in multivariate analyses of transfer and degree attainment.

First, there are significant differences among the three populations in terms of:

- Entering postsecondary education directly from high school;
- Earning 20 or more additive credits in the first calendar year of attendance. Fewer than 20 such credits in the first calendar year of attendance has been shown to be a drag on degree completion (Adelman 1999), and table C-4 (Appendix C) suggests that other potentially damaging features of first-year histories (remediation, number of courses from which the student withdrew or repeated, and GPA) are highly correlated with the 20 credit threshold;
- Earning any credits in truly college-level mathematics in the first calendar year of attendance; and mean number of science, technology and mathematics (STEM) credits earned in the same period.
- Academic performance (first-year mean GPA), only comparing Visitors to the other two groups, suggesting that first year GPA is not likely to play a significant role in multivariate analyses of attainment, a position supported, for example, by findings from an eight-year longitudinal study (1994–2002) of 13,600 entering community college students in the Florida system of higher education (Goodman, Copa, and Wright 2004).[35]

In all these cases, what we observed of academic momentum from high school carries forward: students who became Tenants stand out, and those who became Visitors lag behind.

At the same time, there are no significant or meaningful differences in the extent of remedial course work among the three groups, suggesting that remediation may *not* be an explanatory factor in the fate of students who start out in community colleges. In an ironic turn, the "remedialization of the community college" (McGrath and Spear 1991) may produce a homogenizing experience that ceases to have differential impact. The case of "acceleration credits" illustrates the difference between the significance and meaningfulness of estimates: yes, a statistically-significant lower percentage of the Visitors group came to higher education with dual-enrollment credits and credit-by-examination, but the overall percentage of beginning traditional-age community college students from the High School Class of 1992 who sported any of these credits was low and not meaningful.

---

[35]Segmentation modeling, however, can tease out a stronger role for first-term GPA in combination with selected high school performance indicators (Hyers and Zimmerman 2002).

Table 26. Major features of postsecondary entrance and first calendar year attendance of 1992 12th-graders for whom the community college was the first institution of attendance, by community college residence category

	Community College Residence Trichotomy		
	Homeowner	Tenant	Visitor
Postsecondary entrance and first-year attendance features	(Earned 30 or more credits and 60 percent or more of all credits from community colleges)	(Earned 30 or more credits but less than 60 percent of all credits from community colleges)	(Earned 1–29 credits from community colleges)
Percent entering directly (within seven months) following high school graduation)	79.2 (2.04)	91.8 (2.15)	63.7 (2.70)
Percent earning any acceleration credits[a]	17.1 (2.15)	18.3 (2.49)	11.0 (1.80)
Number of credits earned in first calendar year			
0	2.8 (0.90)	2.8 (0.90)	9.6 (1.35)
1 - 10	17.9 (1.98)	6.8 (1.81)	54.4 (2.78)
11 - 19	30.1 (2.34)	26.6 (3.30)	26.7 (2.72)
20 or more	49.2 (2.55)	63.7 (4.13)	9.3 (1.38)
Percent with no remedial courses in first calendar year	54.1 (2.58)	56.2 (3.53)	46.2 (2.56)
Percent who earned any credits in college-level math[b] in first calendar year	23.0 (2.40)	43.3 (3.67)	7.0 (0.98)
Mean number of STEM[c] credits earned in first calendar year	1.97 (0.266)	3.65 (0.271)	0.81 (0.133)
Mean grade point average for first calendar year	2.62 (0.035)	2.76 (0.056)	2.21 (0.055)

[a] Combination of credits earned in dual-enrollment status prior to high school graduation and credits earned by examination.
[b] College algebra, finite mathematics, statistics, precalculus, and calculus.
[c] Science, Technology, Engineering, and Mathematics. STEM is the preferred acronym used by the National Science Foundation.
NOTES: Standard errors are in parentheses. Where applicable, columns may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

The enormous literature on retention in general, and first-year retention in community colleges in particular, pays substantial attention to nonacademic variables: to institutional culture (e.g., Shaw, Rhoads, and Valadez 1999), to social networks (Thomas 1998), student satisfaction (Ness 2002), employment (Pascarella et al. 1998), and types of financial aid (Murdock et al. 1995; Cofer and Somers 2001). Features of academic organization and processes such as class size in introductory courses (Borden 1995), course loads for entering students (Boughan 2000), and learning communities (Tinto 1997)—all of which may influence persistence and attainment—are also prominent in the literature. With the exception of credit loads, student employment and types of financial aid, however, these factors lie beyond national accounts and are more appropriate for institutional research when the question is impact on early academic progress. The prize suggested by the more narrow academic history of this paper is getting beyond 20 additive credits by the end of the first calendar year of attendance. The reason for highlighting acceleration credits and use of summer terms in this account is to indicate that there are many ways to accomplish that end without carrying full credit loads (in semester systems, 15 or more; in quarter systems, 10 or more). Boughan (2000) includes these among "academic process behavior(s)" that lead through "early term performance" to "general course performance" to, in the long run (Boughan's censoring date was six years after initial community college enrollment) academic achievement.

Content of the First Calendar Year

Underneath the generalized description of credit-types earned in the first calendar year are some revealing commonalities and contrasts in course-taking. At this level of detail, one moves very close to the stuff of learning, and is reminded why any postsecondary institution exists. Put another way, the course-taking data reflects the knowledge-delivery infrastructure of faculty, deans, classroom and laboratory space, and on-line resources that defines the town. If the topic is a "strategic path" to transfer, one cannot overlook this matter (see e.g., Hilmer 1997) and offer a convincing account.

Table 27 draws on 650 discrete course categories (not on the aggregates of those categories that are used in table D-1, Appendix D), and asks what proportion of students completed credits in those courses during the first calendar year of their attendance. Four groups of students are the subjects:

- all students who started in four-year colleges
- all students who started in community colleges, and within this group,
    - those who became community college Homeowners
    - those who became community college Tenants

To be included in the table, the course category had to show enrollment of 5 percent or more by at least one of those four groups. Of the 650 categories, 46 qualified. In table 27 these 46 course categories are arranged in six configurations in a modified version of Boughan's (2001) description of "instructionally defined phases" of the community college curriculum. The first two phases—remedial and "gateway"—are sequential as well:

1. Remedial/precollegiate[36]
2. "Gateway" (English composition and any college-level mathematics course)
3. General Education
4. Occupationally oriented courses that are generally transferrable from community colleges to four-year colleges.
5. Occupationally oriented courses that are generally not transferrable from community colleges to four-year colleges.
6. Personal service and development, the credits for which may be transferrable. These are generally 1-credit or fractional-credit courses.

Ours is a standardized account. Maxwell et al. (2003) performed an analogous examination of the course-taking of first-time students in the Los Angeles Community College District, with course classification following district definitions under which, for example, basic algebra and intermediate algebra were both credit-bearing and applicable toward an associate degree, but not transferrable. In the standardized account, both these courses are precollegiate, hence, remedial and not transferrable.

One major difference between the first year course-taking of four-year college and community college students is expected, and has rippling consequences: higher percentages of community college students in all remedial course categories, particularly mathematics—which draws down the percentage of beginning community college students who earn credits in truly college-level math in their first year. In the terms of Boughan's (2001) flow-model, the Homeowner and Tenant populations of table 27 have concluded the remedial phase by the end of the first year, but some were obviously slowed along the way, and did not pass through all the subsequent gateways during that period. In the general education phase**,** and as a by-product of the occupational-orientation of its student population, the overall community college participation rates come up light in the sciences, humanities, and arts (in this case, confined to music) in comparison to peers who began in four-year schools. What may surprise some is the fairly matched set of participation rates in personal service and development courses by students starting in both four-year and community colleges.

When one shifts from gross comparisons at the four-year versus community college level to the principal community college subpopulations under examination here, one notes a lower participation rate profile in the sciences and social sciences and more visibility of occupationally oriented course work for the community college Homeowners group. As previously observed, there is no difference between the two groups in remedial course participation, at least in reading and English courses. It's not that the Homeowners *should* look like the Tenants in terms of first-year course-taking, rather that one would hope for higher degrees of participation in science, college-level mathematics, and personal communication that would enhance the odds of completing associate degrees in technical fields and being better prepared to enter workplaces

[36]Since, with rare exceptions, remedial courses do not carry additive credits, for purposes of this calculation, each remedial course entry with a flag for a passing grade was given 0.1 credits so that students would be counted by the algorithm.

requiring high levels of communication competence (Carnevale and Desrochers 2002). In fact, when one compares the majors of transfer students from both Homeowners and Tenant groups who earned bachelor's degrees to the majors of a parallel group of students who began in four-year colleges, these biases of early course participation play out, though not with great statistical significance (see Appendix C, table C-5): the community college transfers were less likely to earn their bachelor's degrees in engineering, physical sciences, and mathematics or computer science.

The most striking feature of the data reported in table 27 requires comparing first-year course participation of the community college Tenant population, nearly all of whom eventually transferred to a four-year college, with those who started in four-year colleges. There were no differences between those two groups in nine general education courses (five of them from the social sciences):

> General biology, general psychology, introductory sociology, U.S. government, introductory economics (microeconomics and macroeconomics), Western civilization, introduction to philosophy, music appreciation, and public speaking.

If one adds two courses completed by a significantly higher percentage of the community college Tenant group than those who began in four-year colleges, English composition and college algebra (both of which are gateways), one has more than a full matching academic year with a course portfolio that has touched all lower division bases.

What is the point? The mass of students in the Tenant group—and those who started in four-year colleges—reached a true "ending" of undergraduate study. The courses in this portfolio represent one model for accumulation at the end of the first calendar year of community college attendance, or (for those assigned to one or two remedial courses) a term beyond the first calendar year. The chances that this particular configuration will lead one to a credential in scientific and technical fields are comparatively low because neither pre-calculus nor calculus is in the configuration, but the portfolio offers a strong illustration to secondary school students who will begin in community colleges of the course work that provides momentum toward a degree. In other words, community college representatives can go into secondary school assemblies and say, "if you want to start with us, transfer, and wind up with a bachelor's degree, this is one core of course work that will provide the momentum; but for science, engineering, and business, you will need more than college algebra." Those are clear road signs and operational traffic lights, and provide convincing directions into town—and beyond.

Table 27. The first calendar year of course work: completion rates in 46 course categories[a] by 1992 12th-graders who began in four-year colleges versus those who began in community colleges and those beginning community college students who subsequently became Homeowners and Tenants[b]

Course category	All who began postsecondary study in: Four-year colleges: Percent of all students enrolled	s.e.	Community colleges: Percent of all students enrolled	s.e.	Beginning community college students: Percent who subsequently became: Homeowners	Tenants
Remedial						
Remedial English	8.2	(0.73)	23.4	(1.60)	21.4 (2.09)	20.0 (2.97)
Remedial reading	4.2	(0.42)	14.0	(1.45)	11.5 (1.65)	10.1 (2.57)
Developmental math	4.2	(0.60)	11.6	(1.00)	11.3 (1.52)	6.3 (1.31)
Basic algebra	9.8	(0.74)	23.6	(1.56)	22.8 (2.25)	22.8 (3.02)
Intermediate algebra[c]	6.4	(0.64)	21.4	(1.56)	23.9 (2.30)	30.0 (3.21)
Gateway						
English composition	74.8	(1.06)	63.8	(1.91)	65.9 (2.48)	90.6 (1.64)
Mathematics						
College algebra	21.7	(1.01)	17.0	(1.19)	18.7 (1.96)	30.4 (3.06)
Precalculus	18.6	(0.85)	4.9	(0.77)	4.3 (1.26)	12.6 (2.54)
Calculus	17.6	(0.96)	1.6	(0.26)	1.2 (0.34)	3.9 (0.97)
General Education						
Sciences						
General biology	22.1	(0.96)	12.1	(1.21)	12.8 (1.92)	21.6 (3.24)
Zoology: general	2.4	(0.27)	1.3	(0.27)	1.2 (0.35)	6.2 (2.49)
Anatomy/physiology[d]	1.5	(0.20)	4.1	(0.56)	4.3 (0.64)	5.6 (1.49)
General chemistry	22.3	(0.87)	7.8	(1.11)	6.8 (1.77)	12.7 (2.17)
Astronomy	4.0	(0.41)	2.5	(0.54)	1.7 (0.62)	5.3 (1.91)

See notes at end of table.

Table 27. **The first calendar year of course work: completion rates in 46 course categories[a] by 1992 12th-graders who began in four-year colleges versus those who began in community colleges and those beginning community college students who subsequently became Homeowners or Tenants[b] —Continued**

Course category	All who began postsecondary study in: Four-year colleges: Percent of all students enrolled	s.e.	Community colleges: Percent of all students enrolled	s.e.	Beginning community college students: Percent who subsequently became: Homeowners	Tenants
Social Sciences						
General psychology	44.7	(1.19)	38.3	(1.80)	40.5 (2.49)	47.6 (3.25)
Intro. to sociology	22.2	(0.98)	16.2	(1.10)	16.8 (1.54)	24.4 (2.67)
U.S. history surveys	19.7	(0.99)	17.5	(1.41)	16.4 (1.84)	26.5 (2.94)
U.S. government	14.0	(0.76)	9.5	(0.88)	8.8 (1.16)	13.7 (1.80)
Intro. economics	13.6	(0.79)	7.1	(1.00)	8.8 (1.77)	10.0 (2.19)
Western civilization	10.0	(0.52)	6.8	(0.75)	5.2 (0.87)	12.7 (2.14)
World civilization	8.1	(0.74)	2.6	(0.68)	1.5 (0.43)	4.5 (1.75)
Humanities						
Humanities: General[e]	3.4	(0.46)	4.9	(1.06)	7.5 (2.11)	5.9 (1.24)
Spanish: intro/interm.	12.0	(0.78)	3.4	(0.55)	4.4 (1.17)	5.2 (1.02)
Intro. to philosophy	9.5	(0.65)	4.4	(0.67)	4.0 (0.96)	9.9 (2.36)
Literature: general	8.8	(0.62)	2.9	(0.65)	2.1 (0.42)	5.2 (1.08)
French: intro/interm	5.8	(0.54)	1.3	(0.27)	1.2 (0.42)	1.2 (0.51)
Bible study	5.5	(0.46)	<1.0		<1.0	<1.0
Intro. drama/theater	6.2	(0.57)	1.3	(0.52)	1.0 (0.31)	1.2 (0.47)
Arts						
Solfeggio	6.6	(0.59)	1.1	(0.24)	1.5 (0.47)	1.2 (0.45)
Music performance	7.8	(0.63)	3.2	(0.51)	2.9 (0.62)	5.9 (1.90)
Music appreciation	6.0	(0.71)	2.4	(0.32)	2.2 (0.45)	5.1 (1.02)
Other General Education						
Oral communication	11.5	(0.74)	10.9	(1.29)	8.8 (1.35)	17.7 (2.45)
Public speaking	5.9	(0.62)	3.6	(0.47)	3.8 (0.86)	4.9 (0.98)
Intro. to computing[f]	3.5	(0.34)	11.2	(1.11)	12.8 (1.70)	10.5 (2.22)
General arts and sci.[g]	10.5	(0.62)	1.2	(0.29)	1.3 (0.36)	1.7 (0.93)

See notes at end of table.

Table 27. The first calendar year of course work: completion rates in course categories[a] by 1992 12th-graders who began in four-year colleges versus those who began in community colleges and those beginning community college students who subsequently became Homeowners or Tenants[b] —Continued

Course category	All who began postsecondary study in: Four-year colleges		Community colleges		Beginning community college students	
	Percent of all students enrolled	s.e.	Percent of all students enrolled	s.e.	Percent who subsequently became: Homeowners	Tenants
Occupational: Transferrable						
Intro. to business	3.1	(0.35)	8.7	(0.98)	10.4 (1.74)	10.2 (2.76)
Intro. accounting	4.0	(0.41)	8.7	(0.90)	10.4 (1.50)	9.5 (1.87)
Occupational: Not Transferrable						
Word processing	<1		3.9	(0.71)	5.1 (1.33)	2.3 (0.76)
Keyboarding	<1		4.7	(0.69)	5.4 (1.32)	2.5 (0.85)
Business arithmetic[h]	<1		2.8	(0.56)	5.3 (1.32)	<1.0
Other:						
Health information	7.7	(0.69)	5.1	(0.67)	6.4 (1.27)	5.6 (1.86)
Aerobics, jogging, etc.	13.4	(0.76)	17.1	(1.41)	18.8 (2.30)	21.1 (2.49)
Physical ed activities	18.5	(0.89)	15.1	(1.17)	16.1 (1.92)	23.0 (3.11)
Orientations	13.7	(0.82)	17.8	(1.70)	17.2 (2.34)	21.2 (3.46)
Study skills[i]	4.7	(0.68)	5.4	(0.80)	5.7 (1.17)	5.6 (1.86)
Self-awareness	<1		2.9	(0.89)	5.7 (1.95)	1.9 (0.87)

[a] Only courses in which a minimum of 5 percent of any of the four groups of students enrolled are included. "Completion" means earned credits. For purposes of the calculation, all remedial courses were granted 0.1 credits.
[b] Both Homeowner and Tenants groups started in and earned a minimum of 30 credits from community colleges. The Homeowner group also earned 60 or more percent of their credits from community colleges while the Tenant group earned less than 60 percent of their credits from community colleges.
[c] In some community colleges, intermediate algebra is not considered remedial and carries additive credit
[d] Anatomy and Physiology is a biology "service" course taken by students in nursing or allied health majors.
[e] Survey courses that are more likely to be given in community colleges.
[f] These are not computer science courses, rather advanced computer literary courses.
[g] To a large extent, these are thematic freshman seminars.
[h] More properly labeled "Business Math: Precollegiate," to distinguish it from more advanced business mathematics applications.
[i] Basic academic and intellectual skills development courses, usually carrying no additive credit.
NOTES: Standard errors are in parentheses. Weighted Ns: (a) started in 4-yr = 1.12M; (b) started in community college = 709k; (c) became community college Homeowners = 271k; (d) became community college tenants = 134k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

A Pause to Consider Financial Aid

The issue of the extent to which financial aid plays a role in the careers of students who start out in community colleges cannot be ignored. Both St. John and Starkey (1995) and Cofer and Somers (2001) used the cross-sectional National Postsecondary Student Aid Surveys (NPSAS) to analyze the impact of tuition, financial aid subsidies and debt on *within year* persistence (as a cross-sectional survey, NPSAS captures student history only in the snapshot year of its administration) of community college students. Invoking the 1996 NPSAS survey, Cofer and Somers' results indicated that increases in financial aid, principally through student loans, mitigated the impact of tuition increases on persistence, and that a high debt level was associated with higher persistence rates.

To assess the cumulative impact of the postsecondary financing model (tuition, types and amounts of financial aid, and debt) requires a longitudinal study with full data. The Beginning Postsecondary Students Longitudinal Study of 1995/96-2001, the longitudinal spin-off from the 1996 NPSAS, offers an abundance of financial aid data,[37] but because the BPS:96/01 is not transcript-based and because its precollegiate data are very limited, one cannot build the same analytical models as those possible with a data source such as the NELS:88/2000. For example, the BPS:96/01 does not offer such key variables as precollege education expectations, highest level of mathematics completed in high school, and percentage of postsecondary courses from which the student withdrew or repeated. It tells us whether the student enrolled during summer terms but not how many credits were earned during summer terms; it provides information on the state location of the student's high school and the state location of the first institution attended, but not the state location of any subsequent postsecondary institution attended. When comparing BPS:96/01 student accounts of credits earned in specific periods with transcript-based accounts of parallel groups of students for the same periods from the NELS:88/2000 the differences are substantial,[38] thus attenuating our confidence in this type of data from the BPS:96/01.

The story-lines of this presentation rely on the NELS:88/2000 and, unfortunately, the NELS:88/2000 provides very little information on student financing of higher education. In its third follow-up survey in 1994, two years after scheduled high school graduation, students who had attended any postsecondary institutions as of that time were asked what mechanisms

[37]The financial aid data in the BPS:96/01 are presented by source (federal, state, institutional, private, employer tuition assistance), by aid type (grants, loans, work-study), by year (from 1995–96 through 2000–01), and by amount. Also included are earnings from employment while enrolled, ratios of aid to student budget, prices and net-price by year, and cumulative debt by loan program (Stafford, Perkins, and PLUS). The NELS:88/2000 data set contains none of this information.

[38]For example, in the BPS:96/01 account, 19 percent of traditional-age community college beginners reported earning 0-10 credits in the first year of attendance compared with 40.7 percent (s.e. = 1.8) for the parallel group in the transcript-based NELS:88/2000 account. For BPS:96/01 students starting in four-year colleges, 47 percent claimed to have earned more than 30 credits in the first year of attendance compared with 33.6 percent (s.e = 1.07) in the NELS:88/2000 transcript-based accounts.

they had invoked to finance their education at each institution attended.[39] Three dichotomous variables were created from the responses, indicating whether the student had ever received a grant or scholarship, taken a loan, or been employed under a formal work-study program. Table 28 demonstrates the difference in the proportions of (a) all students who began in a four-year college, a community college, and other sub-baccalaureate institutions by June 1994 who used each of the three financing mechanisms as of that date, and (b) the proportions of each of the community college residence trichotomy groups who used each of the three financing mechanisms through the spring term of 1994.

Table 28. Of 1992 12th-graders who entered postsecondary education by June 1994, percent who used grants or scholarships, loans, and college work-study funds to finance their education, by type of first institution of attendance, and by community college residence category

Features of attendance history	**Percent financing their postsecondary education with:**		
	Grants	Loans	Work-study
First institution of attendance			
Four-year	54.8 (1.19)	38.8 (1.11)	9.2 (0.61)
Community college	33.4 (1.70)	10.4 (0.91)	4.2 (0.72)
Other sub-baccalaureate	56.6 (4.10)	55.3 (4.00)	8.0 (2.49)
Community college residence trichotomy			
Homeowners	36.5 (2.66)	11.7 (1.66)	6.6 (1.70)
Tenants	36.5 (3.22)	8.4 (1.55)	2.9 (0.69)
Visitors	23.7 (2.41)	8.3 (1.05)	2.3 (0.53)

NOTES: Standard errors are in parentheses. Weighted Ns for first institution: four-year = 1.1M; community college = 755k; other sub-baccalaureate = 76k. Weighted Ns for community college trichotomy: Homeowners = 278k; Tenants = 134k; Visitors = 340k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (2003-402).

This information is provided to underscore the fact that traditional-age students who start in community colleges are the least likely to use any of the three major types of financial aid in the first two years of postsecondary education, a relationship supported by BPS:96/01 data for the

[39] This question was not repeated in the fourth follow-up survey in 2000. Instead, the source of financial aid information was left to the National Student Loan Data System which, when closely examined, proves inadequate to the task.

first year of postsecondary education.[40] Table 28 also hints that grants or scholarships are not likely to play a significant role in multivariate analyses of transfer or associate degree attainment for students who started in community colleges and earned 30 or more credits from community colleges (the Homeowner and Tenant groups). The Homeowners in the trichotomy are more likely to have taken loans and participated in college work-study than students in the other two groups, but these percentages are small and not meaningful.

In fact, none of the three financial aid sources could meet the threshold significance requirements for entry into the two logistic analyses of transfer and associate degree attainment in tables 32 and 33 below. This may be a by-product of the weakness of the financial aid data in the NELS:88/2000. Readers who are curious about the types of available financial aid information for traditional-age students whose first institution was a community college in the Beginning Postsecondary Students Longitudinal Study of 1995/96–2001, along with some conditions for interpreting national financial aid data, e.g., the proportion of community college students versus that of four-year college students attending school in California, are referred to Appendix E.

Extending Beyond First-ear Performance

The financial aid story spans the first year and beyond, and brings us to the intermediate phases of the community college journey. When we move beyond the first year of postsecondary attendance in these portrait histories, the paths to undergraduate endpoints begin to emerge, and distinct tones in the characteristics and behavior of those who became homeowner and tenant students suggest different frameworks for judging those endpoints. Table 29 highlights features of attendance and curricular tone that reinforce this suggestion.

The first-to-second year retention rate for both groups is virtually universal, a fact that will surprise some analysts (e.g., Kazis 2004), but is based on a definition that counts enrollment—in any term (and not just the fall term) and in any institution (not just the first institution of attendance)—within two successive academic calendar years (running from July 1 through June 30).[41] The students who lose momentum right away are those who became Visitors.

---

[40] To assess the reliability of these data, analysts are invited to take students who were 20 years of age or less on entry to postsecondary education from the Beginning Postsecondary Students Longitudinal Study of 1995/96–2001, and run the same distribution for types of financial aid received in the first year of postsecondary study (1995–96). For example, in the case of grants or scholarships, the BPS:96/01 figure for those who began in community colleges is 35.7 percent (s.e. = 3.0) compared with 33.4 percent (s.e. = 1.7) for the NELS:88/2000. Thus, however inadequate the NELS:88/2000 longer term financial aid data, they offer face validity for the early college years.

[41] Reflex claims for first-to-second-year community college attrition rates at 50 percent unthinkingly (a) include students of all ages at the point of entry, (b) are measured on a fall term-to-fall term basis thus excluding the 25 percent of first-time community college students who do not start in the fall term, and (c) are concerned only with students who were retained by the same institution, thus excluding students who moved to a different institution in the second year. See Appendix F for an elaboration of this issue.

Table 29. Major features of postsecondary attendance and performance after the first calendar year of enrollment for 1992 12th-graders for whom the community college was the first institution of postsecondary attendance and who earned any credits from community colleges by December 2000, by community college residence category

Postsecondary attendance and performance measures	Community college residence trichotomy		
	Homeowner (Earned 30 or more credits and 60 percent or more of all credits from community colleges)	Tenant (Earned 30 or more credits but less than 60 percent of all credits from community colleges)	Visitor (Earned 1-29 credits from community colleges)
System-wide retention rate from first to second calendar year[a]	98.1 (0.46)	&	71.2 (2.29)
Credits earned in summer sessions			
None	39.4 (2.54)	17.6 (2.61)	69.7 (2.68)
1-4	13.6 (1.71)	15.8 (2.91)	12.4 (1.79)
More than 4	47.0 (2.54)	66.6 (3.93)	17.9 (2.38)
Continuity of enrollment[b]			
Continuous	63.2 (2.45)	83.6 (2.21)	34.9 (2.90)
Late discontinuity	6.6 (1.11)	5.3 (1.59)	3.0 (1.30)
Noncontinuous	27.0 (2.26)	11.1 (1.81)	34.6 (2.66)
Enrolled one year or less	3.2 (1.12)	#	27.5 (2.41)
Ratio of courses from which the student withdrew or repeated to all courses attempted			
0	23.3 (1.99)	19.9 (3.26)	26.5 (2.35)
1-10 percent	35.8 (2.59)	53.9 (3.48)	15.6 (2.12)
11-19 percent	19.1 (1.99)	18.2 (2.60)	14.0 (2.05)
20 percent or more	21.9 (2.23)	8.0 (2.71)	44.0 (2.82)

See notes at end of table.

Table 29. Major features of postsecondary attendance and performance after the first calendar year of enrollment for 1992 12th-graders for whom the community college was the first institution of postsecondary attendance and who earned any credits from community colleges by December 2000, by community college residence category–Continued

Postsecondary attendance and performance measures	Community College Residence Trichotomy		
	Homeowner	Tenant	Visitor
	(Earned 30 or more credits and 60 percent or more of all credits from community colleges)	(Earned 30 or more credits but less than 60 percent of all credits from community colleges)	(Earned 1-29 credits from community colleges)
Mean occupationally oriented credits[c]	17.9 (1.00)	10.8 (0.969)	5.6 (0.911)
Ratio of occupationally oriented credits to all credits attempted			
0	20.6 (2.16)	31.3 (3.47)	99.7 (0.14)
0.1 through .10	26.5 (2.30)	44.0 (3.63)	#
.11 through .33	21.2 (2.31)	17.3 (3.02)	#
.34 through .66	19.1 (1.89)	0.7 (1.61)	#
More than .66	20.6 (2.16)	0.4 (0.27)	#
Number of states in which student attended school			
One	87.6 (1.94)	79.5 (3.57)	89.3 (1.32)
More than one	12.4 (1.94)	20.5 (3.57)	10.7 (1.32)
Percent holding campus job in first two years	12.6 (2.12)	10.6 (3.07)	7.8 (1.48)

& Rounds to 100.0 percent
# Rounds to zero.
[a] First-to-second year systemwide retention rate measurement starts in the first academic calendar year (July 1-June 30) during which the student enrolls at any time. If the student enrolls at any time and at any place during the subsequent calendar year, the student is considered "retained."
[b] In a longitudinal study of 8.5 potentially postsecondary years, the threshold for noncontinuous enrollment is more than one semester (or its equivalent) stop out. "Late discontinuity" is a stop out period of more than one semester (or its equivalent) that occurs only after three years of continuous enrollment.
[c] The sum of credits earned in nine occupational course clusters (see Appendix G for the contents of the clusters).
NOTES: (1) Standard errors are in parentheses. (2) Columns may not sum to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

The Tenant group carries forward its academic momentum from both high school and the first postsecondary calendar year, and builds on that momentum through a high rate of continuous enrollment (84 percent), a heavy use of summer terms (67 percent), and a low ratio of courses from which students withdrew or repeated to all courses attempted.

The Homeowner group may be slightly weaker in matters of continuous enrollment, use of summer terms, and withdrawal/repeat ratio, but far more oriented to occupational curricula. Forty percent of this group earned at least a third of their credits in fields such as business and legal support, electronic and communications technologies, medical and health services, and protective services. As Cohen and Ignash (1994) observed, there is considerable variation in state systems as to whether such courses transfer to public comprehensive colleges and flagship universities.[42] When courses don't transfer, neither do the students who carry large numbers of such courses.

When table 31 appears, covering highest degree earned and enrollment status at the end of the cohort history (December 2000), the reader will not be surprised where the three residence profiles lead. Persistence is not considered an outcome here, even though 15 percent of the Homeowners group and 6 percent of the Visitors were still in school pursuing an associate or bachelor's degree in the year 2000. Persistence is not an event, whereas transfer and the earning of a credential are events.

Two Markers of Attainment

At the outset of this section, it was pointed out that the residence histories were descriptive states, and not outcomes, hence, not dependent variables. The outcomes, markers of attainment, are found *within* the residence histories.

Where did students' academic momentum lead? For the Tenant group, virtually everyone transferred to a four-year college in a classic sequence: starting at the community college and earning more than 10 credits from the community college *before* moving to the four-year college and earning more than 10 credits in the second environment (table 30). Among the Tenants:

- There were no differences in transfer rates by race/ethnicity: 92 percent for Asians, 93 percent for Latinos, and 97 percent for both whites and African-Americans (not in table).

- The bachelor's degree attainment rate, 77 percent (table 31), is 10 points higher than for all NELS:88/2000 students who earned any credits from a four-year college (see Adelman 2004, table 2.2, p. 21).

- By race/ethnicity, the bachelor's degree attainment rate for the Tenants who transferred ranged from 66 percent for Latinos to 83 percent for Asians, but none of the differences were statistically significant (not in table).

---

[42] For in-state community college courses in "marketing and distribution," for example, Cohen and Ignash show a transferability rate of 70.3 percent to the California State University and 1.6 percent to the University of California; 43.9 percent to Texas comprehensive universities and 39.4 percent to research universities; and 91.5 percent to Illinois State University but 0 percent to the University of Illinois flagship campus at Urbana-Champaign (pp. 24-27).

The tenants group sets the event-benchmarks for both transfer and bachelor's degree attainment, and those sector performance indicators are hence employed as dependent variables in multivariate accounts of one of the core missions of community colleges. Reminder: approximately one out of six entering traditional-age community college students became a Tenant.

But another core mission of community colleges is illustrated by the history of the homeowners group, who account for more than 35 percent of entering traditional-age community college students. For the Homeowners, the proportion following the classic transfer model was much lower—one out of five—but the proportion earning associate degrees as their highest degree was substantial in comparison to that for all 1992 12th-graders who began their postsecondary histories in a community college.[43] This associate degree attainment rate sets another event-marker for use as a sector performance indicator, one particularly appropriate to the community college mission focused on occupationally oriented preparation. The community college critics claim that these students would otherwise attend four-year colleges and earn bachelor's degrees, but the data on precollegiate background and first-year performance of the Homeowners, reflected in tables 25 and 26, make it clear that, in the main, these students were not likely four-year college candidates to begin with, and bringing them to an occupationally oriented associate degree is an appropriate goal, not a cooling out mechanism. They are, after all, the long-term residents with a stake in the economy of the town.   Leigh and Gil's (2003) analysis of the Labor Department's National Longitudinal Survey of 1979–1996 points to a similar conclusion in different terms: there is a "terminal" [associate] track and a transfer track, and the students in those universes come to resemble what are described in this paper as Homeowners and Tenants.

So, two markers of attainment emerge as appropriate confirmations of community college missions when elicited through the history trichotomy: (1) transfer and (2) associate degree *from a community college*. These outcomes cut across the residence histories, and are not unique to any one of them. Both Homeowners and Tenants transfer, but in different proportions. Both Homeowners and Tenants earn associate degrees, but for different reasons, and the field of their associate degrees provides distinctive tones. There are no surprises here: 30.7 percent (s.e.= 3.69) of the homeowners group earned the degree in a classic transfer general studies program versus 73.6 percent (s.e.= 4.33) of the Tenants. Nearly 70 percent of the Homeowners who earned associate degrees did so in occupationally oriented fields (for a full distribution of associate degree majors for these two groups, see Appendix C, table C-6).

While the associate degree will receive more emphasis in the third and last of these accounts of community college populations, it is important to underscore the distinction between earning an associate degree from a community college and having that degree stand as the highest degree earned when set against transfer history. A comparison of the homeowner and tenants groups in table 30 highlights this distinction.

---

[43]37.3 percent (s.e. 2.48) for the homeowner group versus 14.2 percent (s.e .= 1.08) for all students for whom the community college was the true first institution of attendance.

Table 30. Of 1992 12th-graders who started in community colleges and earned more than 30 credits from community colleges, the proportion earning associate degrees from community colleges by December 2000, and the proportion for whom the associate degree was the highest degree earned, by community college residence category and transfer status

Community college residence category	Transferred to four-year	Earned associate from community college	Associate was highest degree	Of transfers, earned associate from community college
Homeowners	22.8 (2.37)	42.2 (2.57)	37.3 (2.48)	60.6 (5.71)
Tenants	96.4 (1.01)	35.9 (3.59)	4.4 (0.97)	37.2 (3.70)

NOTE: Standard errors are in parentheses. Weighted Ns: Homeowners = 277k; Tenants = 135k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

For the community college Homeowners, the associate degree tends to be the terminal degree—at least by age 26 or 27 (when the NELS:88/2000 longitudinal study ended). For the tenants group, in which nearly everyone transferred to a four-year institution, the associate degree was more of an interim stop on the road to the bachelor's degree. This is an important gloss on the multivariate analysis. Why? Because instead of setting the dependent variable as bachelor's degree attainment, it reinforces the decision to set the dependent variable as earning an associate degree from a community college, thus providing some guidance on improving the credentialing function of community colleges.

One reason for encouragement in this regard can be observed in the attainment profiles for the three residence history groups in table 31. In the final year (2000) of the history of the High School Class of 1992, over 13 percent of the homeowners group and nearly 10 percent of the Visitors were still enrolled and studying for community college credentials. If we look more closely at those still studying for an associate degree (highlighted in bold in table 31), there is some reason for optimism. The 9 percent of the Homeowners amount to 25,000 potential associate degrees. This group had earned an average of 64.9 credits (s.e. = 5.25) by December 2000, and was carrying a cumulative average GPA of 2.56 (s.e. = 0.99). These marks should be compared to an average of 90.4 credits (s.e. = 1.17) and a 2.95 GPA (s.e. = 0.29) for those who completed terminal associate degrees at community colleges and did not transfer. The differences between those still in school and their parallel reference group imply that there are both credit gaps and academic performance gaps to fill before degrees can be awarded, but the task looks reasonable. Twenty-five thousand additional associate degrees may not sound like much, but set against 565,000 associate degrees conferred by all institutions (not just community colleges) to students of all ages in 1999–2000 (Snyder 2003, table 261, p. 319), it would be a notable improvement.

The 4 percent of Visitors who are still enrolled and studying for an associate degree amount to another 14,500 potential associate degrees. This group has much further to go, having completed an average of only 21.8 credits (s.e. = 2.05) at an average GPA of 2.49 (s.e. = 0.175).

Table 31. Postsecondary attainment of 1992 12th-graders for whom the community college was the first institution of postsecondary attendance and who earned any credits from community colleges by December 2000, by community college residence category

Postsecondary attainment	**Community College Residence Trichotomy**		
	Homeowner (Earned 30 or more credits and 60 percent or more of all credits from community colleges)	Tenant (Earned 30 or more credits but less than 60 percent of all credits from community colleges)	Visitor (Earned 1-29 credits from community colleges)
Highest degree earned			
Bachelor's or higher	6.8 (1.34)	76.9 (3.10)	5.0 (0.88)
Associate	37.3 (2.48)	4.4 (0.97)	1.6 (0.69)
Certificate	8.8 (1.51)	2.2 (0.74)	4.7 (1.48)
None	47.2 (2.55)	16.5 (2.98)	88.7 (1.75)
Educational activity in the last year of the cohort history (2000)			
Studying for graduate degree or post-baccalaureate coursework	0.7 (0.36)	8.4 (2.14)	0.5 (0.18)
Studying for bachelor's degree	6.3 (1.08)	11.0 (2.78)	2.0 (0.52)
Studying for associate degree	**9.0 (1.40)**	1.1 (0.56)	**4.3 (1.08)**
Studying for certificate	4.5 (1.22)	0.4 (0.27)	5.3 (1.21)
Earned a credential in 2000 or not in school	79.5 (2.00)	79.1 (3.27)	87.9 (1.62)

NOTES: Standard errors are in parentheses. Columns may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

Logistic Accounts of Transfer and Terminal Associate Degree Attainment

Of the features of history we have examined, both precollegiate and post-matriculation, which contribute in statistically significant ways to both transfer and associate degree attainment? Tables 32 and 33 present logistic accounts that may help answer the question. As one might expect, there are some overlaps in the answers to what contributes to transfer and associate degree attainment, but these are essentially two different outcomes, and the variables that are both significant and meaningful are products of those outcomes. In both logistic accounts, major demographic variables (those we know for sure antedate the transfer or degree attainment event) did not meet the threshold requirements for inclusion at any stage of construction: race/ethnicity, gender, first generation to attend college, second language background, and becoming a parent by age 20. Socioeconomic status is discarded in the course of the transfer logistic, and plays no role in associate degree attainment. And, as soon as post-matriculation variables were entered in the equation, neither high school curriculum intensity quintile, high school class rank/GPA quintile, senior year test score quintile, nor highest level of mathematics reached in high school met a generous significance entry requirement of .2. In a way, none of this is surprising since the universe is relatively constricted: we know where the students began their higher education and that half the universe (the Homeowners and Tenants), by definition, spent substantial time and effort in community colleges. The comparative degree of heterogeneity in this population will attenuate the effects not only of demography but also of previous academic background.

For a similar reason, some post-matriculation academic history variables also failed to meet the criteria for entrance into a logistic analysis: remediation,[44] first-year grade point average quintile, first two-years' grade point average quintile, and attending a less-than-two-year institution at any time. In a logistic account, the variations within these factors are insufficient to yield meaningful results. The author confesses to disappointment that the dichotomous variable indicating less than 20 credits earned in the first calendar year of attendance also failed to meet the criteria for presentation in these two logistic models, since it plays a role (although marginal) in the logistic presentation of bachelor's degree attainment for students who start out in community colleges (see table 42). Given the dependent variables and the way the populations are defined, however, that may be inevitable (see Szafran 2001 for a deeper exploration of first-year credit loads).

The populations are, in fact, defined differently in the two logistics. The account of transfer includes all students who started in community colleges, earned any credits from community colleges, and had positive values for all other variables in the equation. Students who earned no degree and those who earned certificates, associate, and (obviously in the case of transfers) bachelor's degrees are included. In the account of the attainment of an associate degree from a community college, we want to concentrate specifically on factors associated with earning a *terminal* associate degree. We thus exclude students who transferred to a four-year college, no matter what their residential history—Homeowners, Tenants, or Visitors.

The logistic account of transfer (table 32) offers some very powerful guidelines (although the significance of one variable is puzzling) for matriculation and post-matriculation behavior. While the Delta-p statistics, which tell the story, may be a bit high as a consequence of the heuristic

[44]One dichotomous remediation variable focused solely on remedial reading; another was constructed to rank five levels of remedial problems in relation to bachelor's degree completion. The amount of remediation, however, becomes significant in relation to time-to-degree for those transfer students who earned bachelor's degrees: for those with no remedial courses in the NELS:88/2000 cohort, time-to-degree was 5.31 calendar years (s.e. = 1.08); for those with one or two remedial courses, 5.46 calendar years (s.e. = 1.15); and for those with three or more remedial courses, 5.81 (s.e. = 1.80).

formula employed,[45] they would be substantial even with a modest deflation. Of the nine variables in the model, five are statistically significant at $p < .05$ or better, and two are marginally significant at $p < .10$. Let's review them in order of significance, referring to what the Delta-p statistics indicate:

> Each step up the three levels of **credits in college level mathematics** (more than 4, 1-4, and 0) increases the probability of transfer by 22.7 percent. The temporal boundary for earning these credits is not confined to the first calendar year of attendance.
>
> Each step up the three levels of **credits earned during summer terms** (more than 4, 1-4, and 0) increases the probability of transfer by 19.1 percent.
>
> Students who maintained **continuous enrollment** (the student is allowed one semester or its equivalent of stopout and still qualifies as continuously enrolled), a dichotomous variable, were 22.4 percent more likely to transfer than those who did not.
>
> But if 20 percent or more of all grades received were **withdrawals and repeats**, the probability of transfer **decreases** by 38.7 percent.

The presence and significance of continuous enrollment (which is a positive contribution) and 20 percent of more of all grades recorded as nonpenalty withdrawals or repeats (a negative contribution) is expected as these have proven to be strong contributors to the explanation of degree completion (Adelman 1999). Two other significant variables should prove of considerable assistance in monitoring student progress toward transfer: credit generation during summer terms and credits earned in college-level mathematics. The former is a persistence behavior that adds to academic momentum;[46] the latter serves the same proxy function as highest level of mathematics does in the context of high school performance, and is cited in a different form by Lee and Frank (1990).

The fact that **attendance in more than one state** contributes as strongly as it does to the transfer logistic (the Delta-p says that the probability of transfer increases by 27.5 percent with interstate movement) warrants further exploration. The distribution of multistate attendance by community college history trichotomy in table 29 would not lead one to suspect that this variable would appear at all, let alone with a statistically significant positive parameter, in the logistic account. Ehrenberg and Smith's (2004) analysis of within-state transitions from two-year to four-year public institutions would have us conclude that the best paths to transfer are intrastate because the most promising articulation agreements can be reached within the same public system

---

[45] To remind the reader, for the computation of Delta-p, I am using a short-cut recommended by Paul Allison of the University of Pennsylvania: $bp(1-p)$, where b is the logistic coefficient and p is the probability for the dependent variable in the model. This heuristic produces slightly higher values than the formula advanced by Petersen (1985).

[46] Some 71.3 percent (s.e. = 1.07) of the NELS:88/2000 students who earned associate or bachelor's degrees accumulated summer term credits, compared with only 34 percent (s.e. = 1.34) of those who earned no degree.

boundaries.[47] In light of the proximity analysis invoked by Rouse (1995) the conclusion smacks of common sense. Yet the history of the transfer students from the High School Class of 1992 (the NELS:88/2000 cohort) clearly takes us in the opposite direction. For the time being, this phenomenon remains a puzzle. At the same time, as is obvious in table 33, multistate attendance does not enter the logistic account of community college associate degree attainment at all.

Table 32. Logistic account of factors associated with transfer from a community college to a four-year college in the histories of 1992 12th-graders who started their post-secondary careers at community colleges and earned any credits from community colleges by December 2000

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Odds ratio	Delta-p
Intercept	-7.5135	0.6098	-6.77	.0001		
Credits in college-level math	**1.0438**	**0.1367**	**4.20**	**.01**	**2.45**	**0.227**
Summer term credits	**0.8765**	**0.1285**	**3.55**	**.01**	**2.40**	**0.191**
>20 percent W[a] and repeat grades	**-1.7765**	**0.3069**	**-3.18**	**.02**	**0.17**	**-0.387**
Continuously enrolled	**1.0281**	**0.2399**	**2.36**	**.05**	**2.80**	**0.224**
Attended in more than one state	**1.2618**	**0.3047**	**2.28**	**.05**	**3.53**	**0.275**
Entered directly from high school	1.2532	0.3176	2.17	.10	3.50	0.273
Education expectations	0.4764	0.1336	1.96	.10	1.61	0.104
SES quintile	0.2765	0.0917	1.64	——	1.32	
Occupational credit ratio[b]	-0.3460	0.1065	-1.61	——	0.71	

[a] Nonpenalty withdrawals, as distinct from courses dropped during normal drop/add periods.
[b] Ratio of credits earned in occupational fields to all undergraduate credits earned, in four bands: 0 to .099; .10 to .329, .33-.659, and .66 and higher.
NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by design effect = 1.82. $G^2 = 3243.1$; $df = 2547$; $G^2/df = 1.273$; X^2 (8) = 855.8; p = 001. Percent concordant predicted probabilities: 91.0 Weighted N for those with positive values on all variables in the model = 692k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

[47] One of the keys to successful within-state transfer may lie in a course numbering system common to community colleges and public four-year institutions. A 2001 survey by the Education Commission of the States (ECS) revealed that only seven states (Alaska, Idaho, Florida, Mississippi, Texas, North Dakota, and Oregon) had such systems in place. A second key may lie in a common core of general education requirements that apply to both community college associate of arts programs and four-year bachelor's degree programs that carries a guaranteed transfer. The ECS survey turned up only five states (Alabama, Georgia, Illinois, North Dakota, and Oklahoma) where both parts of those conditions hold (Education Commission of the States 2001).

The matter of the ratio of credits in occupational subjects to all undergraduate credits attempted highlights the reason for investigating the two outcomes—transfer and terminal associate degree attainment—separately in a multivariate format. Recall, from table 29, that this variable was set out in five bands, and that 40 percent of the homeowners group versus 1 percent of the tenants group earned more than a third of their attempted credits in occupationally oriented fields. In the transfer logistic, this is an inconsequential variable with a negative estimate, and supports other research demonstrating that community college students in technical programs are less likely to transfer (Dougherty 1992; Fredrickson 1998). In the exploration of what makes a difference in earning a terminal associate degree from a community college, on the other hand, it is a statistically significant and meaningful contributor to the equation. In table 33, the Delta-p statistic says that each step up the ratio of occupational credits ratio ladder increases the probability of earning an associate degree from a community college by 6.6 percent.

What also enters the associate degree account—but not the transfer account—is the fact of **holding a campus job at some time during the first two years** following the modal high school graduation date of 1992, and the proportion of those holding campus jobs (see table 29) is higher than those on formal Federal Work-Study financial aid (see table 28).[48] The Delta-p says that holding a campus job increases the probability of earning an associate degree from the community college by 16.6 percent. This is a promising finding, and is in keeping with Astin's theories of what makes for student involvement and its contribution to degree completion (Astin 1993). Finding ways to provide more on-campus employment for students who have demonstrated sufficient momentum toward the associate degree might go some way in improving degree completion at that level.

Four variables are common to both the transfer and associate degree logistics. On the side of momentum toward objectives: continuous enrollment; number of credits earned in college-level mathematics; and number of credits earned during summer terms; and detracting from objectives: the proportion of grades that were withdrawals or repeats. While the strength of these variables, differs by population and objective (dependent variable), they are all convincing. They tell us that if you arrive in town, and want to succeed in either moving on to a second knowledge economy or consolidating your knowledge with a credential for a subsequent move into the labor market, here are four guidelines. From the perspective of institutional administrators, each of these guidelines has correlates in environmental design and environmental adjustments.

- Grading policy, for example, is directly within institutional control, and placing limits on the number of no-penalty withdrawals and no-credit repeats may contribute significantly to higher transfer and associate degree completion rates. Some might argue that a lenient no-penalty withdrawal and repeat policy cushions the "shock" of postsecondary entry for underprepared students. But the evidence

[48]The NELS:88/2000 third follow-up survey of 1994 asked questions about different modes of financing postsecondary education for each institution attended up to that point. Federal College Work-Study was distinguished from campus job. Campus job, in fact, was not a subject of the financial aid sequence questions.

clearly shows that *excessive* withdrawal and repeat behavior stalls academic momentum, leads to dropout, not completion, and hence does students no favors. Grading policy is part of town environmental design, and should facilitate participation in the core economy of place so that students can move on to another environment in productive ways**.**

- Summer term offerings yield summer-term credits. It's a matter of access to course work that bolsters academic momentum toward either transfer or terminal associate degree. No doubt many community colleges do this now: but studying what students will take for course work during summer terms—and at what hours—and making sure supply is there to meet demand is like changing zoning ordinances to enhance commercial activity.

- Ensuring continuity of enrollment requires real-time student tracking systems, frequent contact, negotiations for reduced credit loads if necessary—whatever it takes—because the perils of non-continuous enrollment are dear to both the student and the town. For consistent and dependable provision of services, the settlement cannot afford volatility in residence patterns.

- To maximize attainment in college-level mathematics requires creative pre-collegiate outreach programs in cooperation with feeder secondary school districts. It has been noted before in this monograph, and is worth noting again: if community colleges and high schools can move the mass of secondary school students through and beyond algebra 2, we should witness a major shift in postsecondary attainment.

Unlike the account of transfer, the logistic analysis of earning a terminal associate degree from a community college includes entering higher education within seven months of high school graduation (the definition of "direct entry"). As for education expectations: since the two highest levels of the expectations variable reference bachelor's degree attainment, one would expect to see it play a role, however modest, in transfer. When the outcome is flagged as an associate degree, common sense says that bachelor's degree expectations will not be part of the equation—and they aren't.

The logistic account of earning a terminal associate degree also tries out two performance variables from the postsecondary transcript files of the High School Class of 1992 (from the NELS:88/2000) that have never previously been used: (1) whether the student had attained dean's list status at any time, and (2) whether the student had been placed on academic probation or been dismissed for academic reasons at any time. As of this writing, these are probationary variables because it is not clear what proportion of the 2,557 two-year and four-year institutions

Table 33. Logistic account of factors associated with earning a terminal associate degree from a community college in the histories of 1992 12th-graders who started their post-secondary careers at community colleges, earned any credits from community colleges, and did not transfer to a four-year college

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Odds ratio	Delta-p
Intercept	-4.6785	.4117	-8.05	.001		
Continuously enrolled	**1.5962**	**.2630**	**4.30**	**.01**	**4.93**	**0.205**
Occupational credit ratio[a]	**0.5187**	**.0874**	**4.21**	**.01**	**1.68**	**0.066**
Credits in college-level math	**0.8932**	**.1623**	**3.90**	**.01**	**2.44**	**0.115**
>20 percent W[b] and repeat grades	**-1.7705**	**.3753**	**-3.34**	**.01**	**0.17**	**-0.227**
Campus job during first two years	**1.2932**	**.3511**	**2.61**	**.05**	**3.65**	**0.166**
Entered directly from high school	**0.9571**	**.2939**	**2.31**	**.05**	**2.60**	**0.123**
Summer term credits	**0.4455**	**.1362**	**2.32**	**.05**	**1.56**	**0.057**
Dean's list at any time	0.6466	.3176	1.44	——	1.91	
Academic probation at any time	-0.4675	.3635	-0.91	——	0.63	

[a] Ratio of credits earned in occupational fields to all undergraduate credits earned, in four bands: 0 to .099; .10 to .329, .33-.659, and .66 and higher.
[b] Nonpenalty withdrawals, as distinct from courses dropped during normal drop/add periods.
NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by design effect= 1.41. G^2= 1605.9; *df* =1874; G^2/df = 0.856; X^2 (8) = 655.36; *p* = .001. Percent concordant predicted probabilities: 90.4. Weighted N for those with positive values for all variables in the model = 522k.
SOURCE: National Center for Education Statistics: NELS88\2000 Postsecondary Transcript File (NCES 2003-402).

from which transcripts were received enter such information on student records.[49] In a 2002 survey of 1,036 of its member institutions, the American Association of Collegiate Registrars and Admissions Officers (AACRAO 2002) found that 60 percent of responding institutions indicated "academic ineligibility to enroll" on transcripts, a phrasing that implies dismissal, not probation. As part of its 2005 survey of transcript practices, AACRAO is adding questions about both academic probation and dean's list entries, and the results should provide guidelines for adjusting

[49] Received transcripts from 1,197 of the 2,557 institutions (46.8 percent) evidenced one or more of these entries, but with a very uneven distribution by institutional selectivity. It could be that the students in the NELS:88/2000 sample who attended institution X were all quite average, were never placed on academic probation and never earned dean's list status. Hence, we would never know from the received transcripts whether student records at institution X carry pejorative and/or honorific performance entries. Thus, the additions to the AACRAO survey of registrars should prove helpful in providing a complete account.

responses to mitigate any statistical biases. While admitted to the logistic equation, neither of these probationary variables reached the level of significance in this model.

Summing Up

So what do the differences in the two logistic analyses imply for the role of the community college in the lives of students who spend considerable credit-time at those institutions? We come back to the original question of how to enhance completion rates. Over 50 percent of the homeowners group and over 80 percent of the tenants group earned certificates, associate degrees, and bachelor's degrees (table 31). The postmatriculation academic behaviors that made a difference for both of them include continuous enrollment,[50] avoidance of no-penalty course withdrawals and repeats, and earning more than 4 credits in college-level mathematics courses. The records of the Tenants suggest that earning credits during summer terms gives a boost to the academic momentum that leads either to transfer or degree completion. Quite frankly, academic administrators and counselors at community colleges should not be worried about the one out of six traditional-age students who exhibit the records of the tenant group.

But the Homeowners, oriented principally toward occupational programs, exhibit a credential gap that should be addressed, particularly if the community college continues to stress workforce preparation as one of its primary missions, and measures its success in terms of labor market outcomes. One of the conclusions from the mass of data explored for this portrait is that when the ratio of occupationally oriented credits to all undergraduate credits earned rises above 65 percent, degree completion rates fall. In the case of the homeowners group, the proportion earning any degree drops from 59 percent to 30 percent (see table C-12, Appendix C) when the 65 percent ratio is exceeded, even though the students who exceeded that threshold were carrying an average GPA of 2.93 (s.e. = 0.60) after the first two years of postsecondary education, and were not hobbled by excessive remediation. To address this problem, institutional administrators could seek to balance the programs of the homeowners group with more arts and sciences course work. Table C-12 (Appendix C) suggests that adding 9 or more credits of arts and sciences courses would bring everyone in this group (a) into the credit range of associate degree qualification, and (b) below the negative tipping point of the occupational credits ratio. This effort requires careful monitoring of first-year curriculum, interventionary advisement, and persuasion.

---

[50] One reviewer of the draft of this document asked whether there were multicollinearity problems that would account for some of the variance in the logistic regressions, with specific attention to pushing socioeconomic status out of the models. The prime culprit, this reviewer suggested, might be continuous enrollment. A correlation of all potential variables in the two logistic models showed that between continuous enrollment and SES to be .09, i.e., very weak. The only correlation worth noting was that between summer school credits and college math credits at .402 (p <.0001).

-V-
The Third Portrait: Moving on—Community College "Graduates"

Summary

This portrait describes students who started in community colleges, not by their status on entrance (as in the first portrait) or by their residence history (as in the second portrait) but by their final status at the community college. It first divides them by the highest credential they earned at the community college, and, within each attainment category—including no degree but earned more than 10 credits from community colleges—by program type: academic, occupational, or unclassifiable. A key element in the distinction is that of "transferrable curricula." The substance of the portrait lies in its focus on "what happened next?" to the 1992 12th-graders who are its subjects, principally in terms of labor market experience**.**

At the final accounting for 1992 12th-graders in December 2000, half of all students who started in community colleges had left thin or unclassifiable records, and low rates of attainment. For purpose of analyzing the connection between community college history and labor market experience, the histories of these students are insufficient to answer the question, "What happened next?" The occupational program group constituted 17 percent of the universe; and the academic group comprised 33 percent**.**

Sixty percent of the academic group transferred to four-year colleges, and 70 percent of the transfers earned bachelor's degrees. Twenty-two percent of the occupational group transferred, and 53 percent of those transfers earned bachelor's degrees. Within the occupational group, the highest rates of transfer and bachelor's degree attainment were among those in criminal justice and business programs at the community college.

The content of credentials is a critical component of analyses of subsequent labor market histories of all postsecondary students, but particularly those moving on from community colleges, given the work-force development mission of community colleges. Likewise, credentials themselves become more important than earned credit thresholds. If all research addresses are variables such as years of schooling or the fact of attending a community college, it does not enlighten the evaluation of institutional mission.

This study does not use wages or earnings as a labor market outcome because its subjects, 1992 12th-graders, were 25 or 26 years old in the year in which labor market outcome data were collected (1999), and that simply is too early a point in occupational life to judge the effects of education using earnings. Instead, the principal outcomes explored are continuity of employment and degree of congruence between the student's course of study in the community college and occupation at age 25 or 26.

In terms of continuity of employment, credentials appear to count. Over 70 percent of those who had earned either academic or occupational associate degrees from community colleges had been employed full time in at least two years of the 1997–99 period, versus 58 percent of students who had earned more than 60 credits but no credentials. One should not rush to conclusions, though, because 41 percent of the no-degree group was still attending school in 2000.

Congruence between course of study and occupation was attained by 61 percent of students who earned occupational associate degrees from community colleges. No other subgroup registered more than a 30 percent rate of congruity. Forty-two occupational categories and 111 academic and occupational fields of study were used in this analysis. As some academic fields have no counterpart in the labor market (e.g., general arts and sciences associate degrees) and some occupational categories have no counterpart in a field of study (e.g., supervisor/foreman/coordinator), the judgment of congruence was not applicable in a third of the cases**.**

To illustrate at least one analytic framework by which community colleges can judge the adequacy of preparing students for the labor market, the essay takes all students who earned more than 30 credits from community colleges and who were working in computer-related and technical occupations in 1999, and extracts their empirical core curriculum from transcript data. In other words, it asks what these students brought to the labor market when they left town. The mathematics profile of this group is truly college-level; there is a subgroup of students with a coherent cluster of course work in drafting, graphics, drawing, and film studies; one observes a supportive cluster of course work in computer science and programming; and nearly 20 percent of the credits earned by the group were in writing and other communications skills**.**

The community college clearly provided these students with both capacity in symbolic representation and the tools of transformation necessary to assume roles as midlevel technicians. The same glowing report could not be offered in the case of students working in licensed medical and medical support occupations in 1999 because they had been weighed down with too much remedial mathematics, hence limiting full curricular opportunities in the community college setting. The contrast argues for (a) local analysis utilizing a combination of alumni surveys and student record analysis by occupational grouping, so that community colleges (b) can build empirical profiles of curricula likely to be congruent with current knowledge and skill practice in the labor market, and (c) from those profiles, rearrange the pathways, signs (student advising), transport (course scheduling in place and time), and utility systems of the town to match. It also argues, again, for a adjustments to the academic transport system that begins in secondary school.

The last observation—that to improve the degree completion rates of occupationally oriented Homeowners in the town of the community college requires more commerce with districts offering arts and sciences course work—leads to the third portrait of traditional-age community college students. The third portrait is built from a combination of credentialing, disciplinary program, and two critical features of post-community college labor market experience: continuous employment and congruence between course of study and occupation. In the town settlement metaphor of this paper, this stage of history is analogous to that of immigrants who, having settled in an urban place and established a community, began to differentiate and expand their economic activity and patterns of employment (Ward 1975), and ultimately, moved on. This portrait is a derivative of an analytical structure developed by Grubb (1992, 1997) that pivoted on the types of credentials earned at community colleges. Confining the universe to those who first started out in community colleges, we can take Grubb's approach to the difference between students who earned certificates, occupational associate degrees, and academic associate degrees from community colleges (not from other types of institutions), and look at the relationship of these degrees of community college attainment to students' ultimate attainment. To what extent do these credentials lead to something else? To what extent do they differentiate and expand economic life? It is a portrait of "community college graduates," and, as such, the universe is smaller than those previously considered.

But even this approach is partially stymied by the group of community college students whose records qualify them for an associate degree,[51] but who never received one. The associate-degree-eligible population constitutes a small proportion (1.4 percent) of all students who started in community colleges and a slightly larger proportion of those who earned more than 10 undergraduate credits (1.8 percent). However small, this group adds to the universe of credential recipients. Their records can be characterized as occupational or academic by virtue of major (including general studies, the classic transfer curriculum). They are included in the "community college graduates" universe.

In order to approximate Grubb's analytic categories, but employing a wider array of information from the transcripts, a variable called CCGRAD was created with the following values, generated with a cascading if-then-else logic:

[51]The "eligibility" criteria are more than 65 credits, completion of college-level English composition, at least 3 credits in college-level mathematics, at least 3 credits in each of the major general education disciplinary groupings (science, humanities, and social sciences), a "major" (which would include general studies, along with occupationally oriented fields), and a cumulative GPA of at least 2.75. The variable on the NELS:88/2000 data set is called "ASSOELIG." Among the reasons students who, on paper, qualify for associate degrees but do not receive them are (a) students do not know they qualified and did not file papers and pay fees required to receive the degree; (b) students transferred and did not care about receiving the degree; (c) outstanding bills with the community college were not resolved; and (d) physical education or swimming requirements were not met (Garber 2002).

1 Began in a community college, earned an occupational certificate from a community college (see Appendix C, table C-7 for details on certificate recipients).

2 Began in a community college, and either earned a certificate in general studies from the community college, or earned an associate degree in a transferrable field, or was associate degree eligible in a transferrable field

3 Began in a community college, and either earned an associate degree in an occupational field from a community college, or was associate degree eligible in an occupational field, or earned 30 or more credits—but no credential of any kind—with a community college transcript indicating a distinct occupationally oriented major, e.g., communications technologies, paralegal, business support

4 Began in a community college, earned more than 10 credits but no credential of any kind from community colleges, and the no-degree transcript contained sufficient credits in a transferrable field (including general studies) so that the field was indicated as the "major" of the no-degree program;

5 Began in a community college and earned more than 10 credits from community colleges; curriculum could not be classified as occupational or transferrable

6 Began in a community college.

7 Did not start in a community college

For purposes of attaining statistically significant and meaningful results in subsequent analyses in this exploration, the categories of CCGRAD listed above are combined as follows:

1 and 3: Occupational program students;
2 and 4: Academic program students; and
5 and 6: Unclassifiable students who started at community colleges.

Those who did not start at a community college (category 7) are excluded from these analyses.

Transferrable fields included: the macro categories of business (but not business support); computer-related; science and math; arts; general studies; and education or other human services; and the micro categories of agricultural science; ethnic studies; accounting; finance; management; journalism; information technology; computer science; elementary education; foreign languages; nursing; English/letters; biological sciences; psychology; multidisciplinary humanities; and multi-disciplinary social science.

In contrast, occupational macro fields included business support, technology, health occupations (exclusive of nursing but including practical nursing), protective services, trades, personal services, and precision production. Course work in these fields is less likely to transfer to four-year institutions, though it is very difficult to determine from the transcripts exactly what courses and credits did transfer, since institutional practice varies widely in this matter (Dougherty 1992; Eaton 1994; Laanan and Sanchez 1996; Spicer and Armstrong 1996).

Table 34. Highest degree earned by 1992 12th-graders who started their postsecondary education in community colleges, by attainment in community colleges

Attainment and type of curriculum in community college	Highest degree earned anywhere				Percent of students in attainment category
	No degree	Certificate	Associate	Bachelor's or higher	
Vocational certificate	#	80.7 (7.13)	11.2 (3.74)	8.2 (6.77)	**3.8 (0.61)**
Transferrable associate degree, general studies certificate, or associate eligible in transferrable curriculum	6.4 (2.58)	0.2 (0.17)	49.5 (3.88)	43.8 (3.90)	**13.1 (1.00)**
Occupational associate degree or more-than-30-credits-but-no-degree from a community college in an occupational field	31.6 (3.83)	#	55.7 (4.31)	12.6 (2.82)	**13.1 (1.06)**
More than 10 credits from community college(s), no credential from community college, but transferrable curriculum	57.5 (3.24)	1.3 (0.46)	#	41.2 (3.23)	**19.5 (1.23)**
More than 10 credits from community college(s), no credential, from community college, unclassifiable curriculum	91.6 (2.05)	3.6 (1.90)	#	4.8 (0.88)	**26.4 (1.66)**
Other students who first entered community colleges	94.6 (1.54)	4.8 (1.53)	#	0.7 (0..29)	**24.1 (1.33)**

Rounds to zero.
NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

What is the distribution of the community college universe when set out in these categories, and, since this portrait is driven by attainment *at the community college*, what is the distribution of students within each category by overall attainment? Table 34 answers both questions, and points us toward the path of differential labor market outcomes analysis, hence overcoming some of the definitional problems encountered by Kane and Rouse (1995) and Leigh and Gill (1997) in the Department of Labor's NLS-Youth longitudinal study data. What do we see?

- Fifty percent of all students who start in community colleges leave thin or unclassifiable records, and low rates of attainment. For purposes of labor market experiences following postsecondary careers, the groups that comprise this universe will not offer sufficient information for answering the question, "What happened next?" There is a small group within this category who earn bachelor's degrees. Like some of the incidental populations described earlier, these students were incidental community college beginners, basically "touching base" with the community college before moving on to a four-year.
- The students who earned certificates or associate degrees in occupational fields from community colleges or who earned no degree but 30 or more credits with a distinct occupational major constituted one out of six who began in community colleges.
- The students who either earned transferrable credentials or finished with no degree but a transferrable curriculum constituted nearly a third of those who began in the community college universe.
- Bachelor's degree attainment rates are highest (as expected) among those who earned either transferrable credentials or finished careers in community colleges with transferrable curricula.
- There is no difference between the transfer and occupational degree groups in the rate of attainment of associate degrees from community colleges.

Recalling the three missions of community colleges that appear in the histories we read in longitudinal studies of traditional-age students (Bailey and Averianova 1999)—collegiate, vocational, and remedial—the records of these groups reflect a mixing of the missions. Table 35 offers an example.

Table 35 reinforces our impression of the unclassifiable group as weaker on all counts. Comparatively, they do not earn many credits, and part of the reason for that is their higher rate of participation in nonadditive remedial course work. Because they do not earn many credits, they also have little chance to take occupationally oriented course work, assuming they were disposed to do so in the first place. There is no difference in the remediation profiles of the academic and occupationally oriented groups. But obvious (and expected) differences between those two groups emerge in the distribution of occupationally oriented credits, and in the lower over-all mean community college credits of the academic group, of which 60.4 percent (s.e .= 2.37) were transfer students—versus 21.7 percent (s.e. = 3.53) of the occupational group and 9.3 percent (s.e. = 1.88) of the unclassifiable group.

Table 35. For 1992 12th-graders who started in community colleges, the number of remedial courses taken, ratio of occupational credits to all undergraduate credits, and mean total credits earned at community colleges through December 2000, by consolidated community college attainment group

Community college attainment group	Number of remedial courses		Ratio of occupational to all undergraduate credits[a]		Mean total additive credits from community colleges
	None	More than two	0 – .099	More than 0.66	
Academic	46.6 (2.51)	19.5 (1.90)	41.7 (2.44)	0.4 (0.37)	58.9 (1.15)
Occupational	39.4 (3.78)	23.8 (3.38)	6.2 (1.76)	24.0 (3.19)	66.2 (1.99)
Unclassifiable	33.9 (2.38)	31.5 (2.40)	77.6 (2.02)	0.4 (0.14)	13.6 (0.60)

[a] Extreme ranges are for illustrative purposes only.
NOTES: Standard errors are in parentheses. Weighted Ns: Academic = 265k; Occupational = 137k; Unclassifiable = 350k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

Given the relatively small proportions of Occupational and Unclassifiable students who transfer, it is difficult to compare degree-attainment rates for these transfer students at any level of credential. But one could add a note about the comparative performance of transfer students in all three groups, measured in a ratio of GPA in community colleges to GPA at the four-year institution. The story is the same for all three—the community college GPA is slightly higher than the four-year college GPA, but, for those who earned bachelor's degrees, only the Occupational group recorded higher grades in community colleges (see Appendix C, table C-8). The bachelor's degree data support Glass and Harrington's (2002) conclusion that if transfers experience any GPA "shock" at all, they eventually recover (for a similar analysis, see Cejda, Kaylor, and Rewey 1998).

A more discrete account of transfer rates for those who earned associate degrees is helpful here, because the rate of transfer differs widely by field of the degree, and provides further guidance for judging the overall transfer rates (whether the student earned an associate degree from a community college or not) of Academic and Occupational students. In table 36, which sets out these distinctions, few differences of pairs of estimates are statistically significant and fewer, still, are meaningful. But the table does allow us to point out that, exclusive of the core academic associate degrees (general studies, liberal arts and sciences, and science), students earning associate degrees in protective services (principally, criminal justice) and business were more likely to transfer and earn bachelor's degrees than those who earned associate degrees from community colleges in technology and health occupations.

Table 36. Of 1992 12th-graders who started in community colleges and earned associate degrees from community colleges, the proportion who transferred to a four-year college, and proportion who earned bachelor's degrees by December 2000, by associate degree major

Associate degree major	Percent who transferred	Percent earning bachelor's	**Percent of all associate degrees**
General studies	71.6 (4.26)	54.0 (4.95)	**42.3 (3.26)**
Science and Math	63.5 (10.7)	48.0 (10.2)	**3.5 (0.78)**
Protective Services[a]	56.1 (12.4)	39.1 (14.0)	**6.3 (1.65)**
Business	41.0 (7.02)	32.3 (6.63)	**6.5 (1.01)**
Education, human services	40.0 (15.3)	13.7 (7.23)	**3.7 (1.18)**
Business support[a]	35.4 (16.1)	3.3 (2.09)	**9.5 (2.64)**
Arts, applied arts	31.6 (10.5)	27.7 (10.1)	**3.0 (0.69)**
Computer-related	19.3 (9.11)	19.3 (9.11)	**2.1 (0.54)**
Technology[a]	16.7 (7.15)	12.9 (6.52)	**7.6 (2.05)**
Health occupations[a]	14.9 (4.93)	13.5 (4.77)	**8.1 (1.29)**
Trades, precision-production[a]	3.4 (3.51)	#	**2.9 (1.10)**
Other	16.5 (9.04)	5.1 (3.60)	**4.6 (1.81)**

Rounds to zero.
[a] Occupational category.
NOTES: Standard errors are in parentheses. Column for percent of all may not add to 100.0 percent due to rounding. Weighted N=166k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

Why are these differences important? Because when one seeks to connect education histories to labor market histories the content of credentials becomes a critical component of our assessment, and credentials themselves become more important than earned credit thresholds. The questions of who earned credentials, and in what fields, and whether transfer was part of the story line, require the construction of a universe that contains all three elements. For labor market outcome analysis to focus simply on years of schooling or the fact of attending a community college does not enlighten the evaluation of institutional mission.

Earnings and Returns to Community College Education: The Community College Graduates

Grubb has been consistent in maintaining that the judgment of community college effects should focus on labor market experience since "their occupational purposes are central" (Grubb 2002, p.300). He is not alone in claiming that when the educational requirements for occupations increase, the occupations most affected are those requiring less than a baccalaureate degree. Carnevale and Desrochers (2002) point to the demand for "short bites of education and training to keep up with changing skill requirements" (p.9) as one of the principal pressures on the occupational portion of the mission of comprehensive community colleges, but these "short bites" are not captured by the transcript-based histories of traditional-age students. What we have seen captured is the process of building a base of knowledge and skills in specific occupationally oriented fields, something that postsecondary students do in their early twenties (they may return later for upgrading) and for which community colleges must program. The labor-market outcomes questions that one can reasonably ask in light of the empirical base concern (1) continuity of employment, and (2) congruence between course of study and occupation.

Wages, a staple of economic analyses of returns to schooling with the community college as central focus (Lin and Vogt 1996; Dougherty 1994; Sanchez, Laanan and Wisely 1999), are not included among labor market outcomes in this study. The age of the NELS:88/2000 students in the most recent year for which full earnings data are available, 1999, was 25 or 26. As Grubb points out (2002), this is too early a point in one's labor market history at which to judge the relationship of earnings to education. The reason so many analysts who study that relationship use either the U.S. Department of Labor's NLS-Youth longitudinal study of 1979[52] or the U.S. Department of Education's NLS-72 longitudinal study is that the subjects of the former were interviewed over a period of 16 years, and, in the case of the latter, the High School Class of 1972 was followed for 14 years. Earnings for the subjects of these cohorts are available at a minimum of age 30 or 31, a far more reasonable point at which to conduct earnings-related analyses, even if the data are dated.

Grubb (2002) concluded that the wage benefits of even 12 credits from community colleges are something of a zero, and suggests a productive threshold for measuring economic impact at 30 credits. That threshold supports the community-college-dominant student construct reflected in the portraits of Homeowners and Tenants, and justifies our leaving incidental students out of the analysis. This position is endorsed by Dellow and Romano (2002), who also used a 12-credit threshold to demonstrate comparative population graduation rates at Broome (county, New York) Community College. Incidental students, as Dellow and Romano point out, are often "nonmatriculated," and, as such, not typical of the college population writ large. But for labor market outcomes analysis, credentials may speak louder than gross numbers of credits, no matter what the dependent variable. That is the hypothesis.

Credentials Versus Credits

For example, what is the difference between earning an associate degree and earning 60 credits? The issue has arisen in previous literature (Grubb 1989, Kane and Rouse, 1995, Surette 1997, Grubb 2002), though not always phrased in those terms. The literature measures the differential in terms of earnings. Since the NELS cohort was too young to justify this measure, this paper starts with continuity of employment. The NELS:88/2000 students were interviewed in the spring of 2000, and were asked for their primary occupation and industry, number of weeks worked, and hours worked in a typical week in 1999. The interview respondents were then asked for abbreviated employment histories for 1998 and 1997 (employed full-time, employed for at least six months). From these responses were constructed three combinations of employment

---

[52] This study began in 1979 with a national sample of 11,406 youth, 14–21, and 1,280 youth, 17–21, who were in the armed forces. This is obviously a more diffuse group in terms of age and school status than those of the grade-cohort longitudinal studies. The sample on the occasion of its last interview in 1994 was 8,891. (http://stats/bls.gov/nls/nlsyouth.htm). A new NLS-Y study began in 1996.

history. In descending order of intensity, they are presented in table 37. The table compares the continuity of employment for three populations: those who had earned academic associate degrees from community colleges, those who had earned occupational associate degrees from community colleges, and those who earned no degree but 60 or more credits.

What does this table tell us? The critical line is that of continuity and intensity of full-time employment in all three years. Some 71 percent of those who earned academic associate degrees and 79 percent of those who earned occupational associate degrees were employed in all three years and employed full time in at least two of them, versus 58 percent of those who earned 60 or more credits but no degree. The differences are statistically significant. But the data also provide a partial explanation for the difference: forty-one percent of the students who had not earned degrees were still enrolled in postsecondary education at the end of the period versus 16 percent of those who had earned academic associate degrees and 11 percent of those who had earned occupational associate degrees. The story is more complex, then, than a simple dichotomous outcome would suggest, and opens up a line of inquiry that goes beyond the boundaries of this study, namely the effects of mixtures of enrollment intensity and continuity of labor market participation by associate degree holders versus others on a year-by-year basis. But superficially, at least, degrees seem to matter more than earned credits.

Table 37. Of 1992 12th-graders who started in community colleges, a comparison of those who earned associate degrees with those who earned more than 60 credits but no degree by December of 2000, by continuity of employment in 1997, 1998, and 1999

Continuity of employment	**Earned associate** Academic	Occupational	No degree but 60 or more credits
Employed full time in at least two years of 1997, 1998, and 1999	71.4 (2.75)	78.8 (4.45)	57.6 (5.62)
Employed part-time in at least two years of 1997, 1998, and 1999	16.4 (2.12)	14.9 (4.11)	24.1 (5.76)
Unemployed, out of the labor force or employed for less than six months over the three-year period, 1997–99	12.3 (2.26)	6.7 (2.11)	18.3 (4.26)
Proportion still enrolled in postsecondary education in 2000	15.8 (2.04)	10.6 (3.81)	40.7 (5.03)

NOTES: Standard errors are in parentheses. Columns for employment may not add to 100.0 percent due to rounding. Weighted Ns: academic associate degrees = 84k; occupational associate degrees = 83k; 60 or more credits but no degree = 82k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402).

Congruence Between Occupation and Course of Study

"Related employment" (Grubb's phrase) is another issue, one that is an important goal for many community college students (Secolsky 2002), and one that is occasionally considered as an indicator of institutional effectiveness. The challenge to the analyst lies in determining the extent to which one's occupation and duties and (sometimes) industry correspond to the dominant tone of one's course of study. An ideal example in a community college setting would be a student who has earned an associate degree in medical technology who later works in a medical laboratory analyzing blood chemistry. Of this case one would say that there was a general degree of congruence between the associate degree major and the occupational field, no matter what the student may say in an interview about the extent to which their current job was related to the program of study (see Pincus 1980 for a summary of studies using interview data as opposed to unobtrusive information).

The keys to confidence in analyses of congruence are accuracy of coding of occupation and the level of detail on course of study available only from transcript information, both of which reflect generic problems in the use of archival data (Livi-Bacci 1991). For the NELS:88/2000, fully one out of out six initial codings of "current/most recent occupation [in 1999]" were wrong and had to be revised before any analysis could be performed. How do we know they were wrong? By comparing the literal responses from the computer assisted telephone interview against what was coded by the contractor, utilizing 39 occupational codes. If, in response to questions about occupation and principal duties on the job, someone said "automobile mechanic: diagnose and fix brakes and transmission," and the response was coded as "laborer" when an alternative value indicating "mechanic, repairer, installer" was available, the initial coding was erroneous, and was edited accordingly.[53] In addition to the corrections, three new occupational categories were added in the editing process: graphics/design occupations; administrative assistant (as distinct from secretary or other clerical categories); and human resources development/administration. For a full account of the 42 occupation codes used in this study, see Appendix H.

A variable for congruence between undergraduate field of study and occupation at age 25 or 26 (in 1999) was then created for all students from the High School Class of 1992 who continued on to postsecondary education as follows. First, it applied only to students who earned credentials —bachelor's degrees (but excluded those who also earned graduate degrees), associate degrees, certificates, and no degree but 30 or more credits—*and* who held an identifiable occupation in 1999. Everyone else (37.6 percent of the NELS:88/2000 participants who attended postsecondary institutions) was marked out-of-scope. The variable was built in a descending logic from the highest level of undergraduate attainment. That is, one starts with those who earned bachelor's (but not graduate) degrees, then moves to those whose highest degree was the

[53]Other examples include "church organist" classified as a human services worker instead of "artist/performer," a chef classified as a sales clerk, and a timber purchasing agent as a farmer. All corrections and additions to the original occupational coding in the NELS:88/2000 data set appear on the supplemental file to NCES 2003-402.

associate, then to the certificate level, and finally to no degree but 30 or more credits *and* an identifiable major.

At each of the four attainment levels, the first judgment was whether the student's field of study had a counterpart in the labor market—at least among the 42 occupational categories in play. Some fields have no such counterpart: they "neither have specific areas of employment in mind nor train for practical purposes," and their graduates will be "widely dispersed" (Brennan, Kogan, and Teichler 1996, p. 14)**.** In these cases, the decision of whether the student's occupation is congruent with course-of-study is moot, hence is classified in table 36 as "not applicable." For example, general studies associate degrees, and humanities majors among bachelor's degree recipients (though those who majored in writing of any kind were subject to judgment because there is an occupational category for editors/writers/media communication workers) were cases of "not applicable."

Likewise, some of the 42 occupational categories have no counterpart in field of study. Examples include the large (6.5 percent of all students who indicated an occupation) category for supervisors/foremen/coordinators/assistant managers, and the category of administrative assistants. In fact, students coded with these occupational categories were ruled out-of-scope for the judgment of congruity. For a full catalogue of what was coded as a "congruent" relationship for this analysis, see Appendix I.

The analysis itself is presented in table 38. The universe consists of all students who began their postsecondary careers in community colleges, who qualified for one of the community college attainment categories, including those who earned bachelor's degrees, and who indicated both an occupation and positive employment status for 1999. What is significant? And what is meaningful? For each community college attainment group, we look at the difference in the estimates for participation in a congruent occupation versus participation in an occupation that does not meet the standards of congruence with the student's major. There is only one category of community college graduate for whom this difference is significant—those who earned associate degrees in occupational fields. If one were assessing community college success in preparing students for the workforce, and congruence was a major criterion for success, then moving more students from incomplete occupational programs to the Associate of Applied Science (A.A.S.) degree would be an important first step.

Table 38. For 1992 12th-graders whose first institution of attendance was a community college, the degree of congruence between occupation in 1999and field of study, by community college attainment status

Community college attainment status	Relationship between 1999 occupation and field of study		
	Not congruent	Congruent	Not applicable
Started in and earned occupational certificate from a community college	56.5 (8.89)	35.3 (9.11)	8.1 (2.79)
Started in and earned academic associate degree from a community college	27.9 (2.86)	29.3 (3.41)	42.8 (3.26)
Started in and earned occupational associate degree from a community college	28.1 (4.65)	61.0 (5.55)	10.9 (4.18)
Earned no degree but 30+ credits and an academic program at a community college	26.6 (3.25)	22.9 (3.46)	50.4 (3.77)
Earned no degree but 30+ credits and an occupational program at a community college	43.6 (5.51)	30.5 (3.75)	25.9 (4.34)

NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding. Weighted N = 350k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402) and Supplement.

Where would one look in the community college workforce preparation curriculum to make that assessment? Where is the congruence likely to originate? Table 39 takes five categories of community college graduates and compares the distribution of occupations in which students from these groups were working in 1999. It uses 20 occupational categories, some of which are aggregates (e.g., three computer-related categories and three managerial categories were collapsed), and reveals the community college's strong suits—protective services, business support, computer-related, and medical licensure and support occupations. What may be disappointing in the distribution of those who earned occupational associate degrees is the proportion—one out of five—who were employed in clerical positions in 1999. Making sure that these students have stronger options for entering business support occupations (e.g., contract specialists, bookkeepers, medical billing administrators, and property managers) when they move on from their residence in the community college "town" requires monitoring of their course portfolio. Making sure they have a niche, something that stands apart, such as courses in accounting information systems, a survey of health care systems, or a general introduction to law, for example, may go a long way toward reducing the proportion of those students who wind up in clerical jobs.

The occupational category in which students find themselves (even at age 26) may be influenced, in part, by the highest degree they attained beyond their terminal status at a community college. For this reason, table 39 also offers the proportion of each community college attainment group that subsequently earned a bachelor's degree (the figures are borrowed from table 34). It is not surprising that a notably higher proportion of students in the "academic" categories were working in education and as financial service professionals than those in the occupational categories.

More adequate assessments would include the precise occupational program in which students either earned degrees (and by level of degree) or in which they assembled credits in a field sufficient to characterize their undergraduate course of study. But the universe of table 39 is already divided in such small pieces that the standard errors of the estimates take us beyond the borders of significance. Even more adequate assessments should take into account regional labor markets and unemployment rates in those markets during the period at issue (for the NELS:88/2000 cohort, 1997–99). And even more adequate, still, would be a detailed account of learning that takes place outside the formal higher education system (self-study online or through CDs, apprenticeship, employer-provided training, or through training partners in the information technology sector).[54] Those assessments, however, lie beyond the purposes of this study.

What They Brought to Their Occupations From the Community College

But before leaving the topic, we can strengthen the scaffolding for judging early labor market outcomes. So far in this narrative of the relationship between community college "graduate" categories and labor market experience variables, we have used credentials awarded, credits earned, and gross type (occupational or academic) of credentials and credits. But looking backwards from the position of the 1992 12th-graders in the 1999 labor market, the transcript records provide very detailed information of what students brought to their occupation from formal study. We can determine not only in which offerings of the economy of the town these students engaged, but also how much of their time moving along curricular paths was spent in specific curricular districts. Time is very much part of this landscape (Lynch et al. 1977).

---

[54]While the NELS:88/2000 panelists were asked (in both 1994 and 2000) about training, the questions were limited to purpose, place, provider, sponsor, relevance, and impact on career. No questions were asked about the content of training.

Table 39. Occupation in 1999 for 1992 12th-graders who started postsecondary education in a community college, and who earned more than 10 credits from community colleges, by community college attainment status

	Attainment Status at Community Colleges				
	Vocational certificate	Academic associate	Occupational associate	No degree: academic	No degree: unclassifiable/ occupational
Percent of all:	**7.2 (1.18)**	**25.5 (1.74)**	**15.7 (1.70)**	**26.6 (1.87)**	**24.9 (1.83)**
Percent of each attainment status group who earned bachelor's degree:	***8.2 (6.77)***	***43.8 (3.90)***	***12.6 (2.82)***	***41.2 (3.23)***	***4.8 (0.88)***
1999 Occupation					
Clerical	7.1 (2.46)	10.0 (1.87)	20.2 (5.71)	9.7 (1.74)	14.0 (3.48)
Personal service[a]	2.0 (1.07)	3.6 (0.98)	1.3 (0.67)	5.2 (1.50)	7.3 (2.42)
Laborer	12.3 (6.62)	3.1 (0.94)	3.4 (1.12)	4.4 (2.29)	5.5 (1.14)
Mechanic/repairer	6.8 (3.32)	0.6 (0.33)	3.1 (1.20)	0.8 (1.20)	5.0 (2.20)
Crafts[b]	2.9 (1.57)	1.0 (0.51)	4.9 (2.81)	4.2 (1.11)	4.9 (2.09)
Skilled operative	13.3 (6.94)	1.2 (0.54)	2.2 (0.85)	0.8 (0.43)	4.4 (2.15)
Transport operative	1.1 (0.91)	0.5 (0.31)	0.5 (0.38)	2.0 (1.14)	0.8 (0.40)
Protective service	2.8 (1.66)	2.2 (1.00)	10.5 (3.78)	1.9 (0.63)	5.0 (1.33)
Business support[c]	18.6 (9.86)	9.6 (1.68)	9.1 (3.95)	12.5 (3.64)	8.3 (2.30)
Fin. service profess.[d]	0.5 (0.48)	4.3 (0.96)	0.9 (0.50)	5.7 (2.96)	0.8 (0.40)
Sales/purchasing	0.7 (0.68)	7.4 (1.44)	3.2 (1.49)	5.3 (1.09)	9.7 (2.73)
Med. licensed prof.[e]	6.7 (3.11)	2.6 (0.91)	9.3 (2.66)	1.4 (0.98)	0.4 (0.27)
Medical services	7.3 (2.30)	2.3 (0.96)	8.3 (1.84)	4.7 (1.24)	3.4 (0.80)
Education[f]	3.7 (1.63)	11.2 (2.32)	4.5 (2.39)	11.2 (2.44)	4.4 (1.09)
Human services[g]	0.4 (0.39)	5.4 (2.11)	0.3 (0.31)	2.5 (0.88)	0.9 (0.40)
Technical	3.2 (1.69)	5.8 (1.72)	5.1 (1.38)	7.3 (1.78)	6.4 (1.72)
Computer-related	1.3 (1.34)	11.6 (3.66)	8.3 (4.88)	4.4 (2.02)	1.9 (0.69)
Manager	1.0 (1.03)	2.3 (0.69)	0.6 (0.41)	3.6 (1.06)	4.0 (1.96)
Supervisor[h]	1.2 (0.89)	4.7 (1.01)	0.4 (0.29)	6.3 (1.41)	6.4 (2.32)
Other	7.0 (2.48)	10.7 (2.14)	3.9 (1.19)	6.3 (1.26)	6.6 (1.48)

[a] Includes waiters, hair stylists, daycare providers
[b] Includes carpenters, plumbers, electricians, cabinet makers
[c] Includes bookkeepers, claims adjustors, customer service, etc.
[d] Includes accountants, stock brokers, investment analysts, etc.
[e] Includes nurses, physical therapists, speech pathologists, etc.
[f] Includes school teachers, teachers' aides, trainers, graduate teaching assistants, etc.
[g] Includes social workers, counselors, clergymen
[h] Includes foremen, coordinators, project directors
NOTES: Columns may not add to 100.0 due to rounding. Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

The method for doing so involves *credit ratios*. For any group of students, all earned credits from all course categories are added. The total is a finite drinking glass of 100 percent that becomes the denominator for subsequent calculations. These calculations ask what percent of the total credits earned by that group of students (the full glass) were earned in a particular course category. There are over 1,000 course categories in the postsecondary transcript files.[55] For any one category to produce 0.5 percent of all credits earned by a group of students is a substantial amount. To be sure, this accounting does not include credits *attempted* but not earned due to withdrawal or failure. But the accounting can trace and help measure both concentration and diffusion in what students study.

If the question, "What proportion of all credits earned by this group of students was earned in each course category?" was asked, and the results ranked by percent of credits earned in each course category, the top 20, 30, or 50 course categories could then be said to constitute an "empirical core curriculum." The number of courses selected is arbitrary**,** the first statement of a hypothesis as to what constitutes the threshold for a "core."

Table 40 takes all students from table 39 who were working in technical or computer-related occupations in 1999, but raises the threshold for credits from community colleges from 10 to 30 in order to provide more reliable estimates. It adds up the credits these students earned *from community colleges* in academic and occupational course categories,[56] and displays the 35 categories generating the highest percentage of those credits. Though the students may have earned credits from other types of institutions, these categories represent the community college's contribution to what they brought to the labor market when they left town. While enrolled in community colleges, these students earned credits in 143 discrete course categories. The 35 categories in table 40 accounted for 77.5 percent of all credits—as proxies for time—they spent in the core economic activity of the community college town. The concentration reflected in these 35 categories tells us that these students were not playing in vacant urban lots, places devoid of imagibility and economic activity (Lynch et al. 1977), rather that they had followed clear signs in academic processes to districts with distinct commercial and environmental characteristics**.**

The curriculum one sees in table 40 is both balanced and likely to lead to a congruent occupation in a technical or computer-related field. The mathematics profile is college-level, with the presence of finite mathematics (the foundations of computer mathematics) very appropriate to future occupation. There is a subgroup of students obviously heading toward occupations in the general field of drafting, with course-taking in drawing and film studies included in the tenor of this body of study. If one is to judge from the combination of psychology courses and secondary

---

[55]See the *Taxonomy of Postsecondary Courses Based on the National Transcript Samples: 2003,* a file included at http://www.ed.gov/rschstat/research/pubs/empircurr/index.html.

[56]The denominator excludes credits earned by examination and in physical education activities, personal health information courses, and personal development and interpersonal relations**.**

education, it is possible that some students gave thought during their community college careers

Table 40. The 'empirical core curriculum' of 1992 12th-graders who started in a community college and earned 30 or more credits from community colleges who were working in technical and computer-related occupations in 1999: top 35 courses by percentage of total credits earned from community colleges

Course category	Percent of all credits earned from community colleges
English composition	16.7
College algebra	6.6
General chemistry	5.4
U.S. history surveys	4.3
Precalculus	3.7
General biology	3.6
General psychology	3.2
Intermediate algebra	3.0
Introduction to computing	2.2
Finite mathematics	2.2
Introduction to engineering	2.0
Drawing	1.8
Introduction to film studies	1.6
Technical drafting	1.5
Secondary education	1.4
Developmental psychology	1.4
Abnormal psychology	1.4
U.S. government	1.4
Electronic or electrical technology	1.2
Computer-assisted drafting (CAD)	1.1
Introduction to sociology	1.1
Business law	1.1
Introduction to economics (micro/macro)	1.1
Introduction to computer science	0.9
Community health	0.9
Interpersonal communication	0.9
Spanish: introductory and intermediate	0.9
Introduction to business	0.8
Oral communication	0.7
Architectural drafting	0.7
Cooperative education placements	0.7
Computer programming (general)	0.7
Architectural and construction technology	0.7
Calculus	0.6
Total:	77.5

NOTE: When the course, and not the student, is the fundamental unit of analysis, then even weighting course credits by student characteristics cannot produce standard errors. That is, these are not statistics of students, rather statistics

of course credits earned by students with specific characteristics.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript File (NCES 2003-402 and Supplement).

to the idea of teaching. Remediation would not turn up in a credit ratio account such as this since remedial courses carry zero additive credits, but we know from other algorithms determining course participation that 16.7 percent (s.e. = 3.33) of these students took remedial English courses, a figure well below the rate for students who earned more 30 or more credits from community colleges (see table D-1, Appendix D), implying above average academic background for the group as a whole .

Whatever its background in communications skills, the group spent over 16 percent of its credits in regular English composition, and another 3 percent in other communication-related courses (oral communication, interpersonal communication, and Spanish). Technicians, as Whalley and Barley (1997) note, "work at the empirical interface between a world of physical objects and a world of symbolic representations," and "transform aspects of the material world into symbolic representations which can be used for other purposes" (p.47). The empirical core curriculum of the community college students from the High School Class of 1992 who found themselves in technical and computer-related occupations at age 25 or 26 clearly appears to have provided them with both capacity in symbolic representation (mathematics) and the tools of transformation (computer programming and drafting).

This analysis could—and should—be repeated with other occupational groupings, so that we can build empirical profiles of congruent curricula, and from them rearrange the pathways, signs (student advising), transport (course scheduling in place and time), and utility systems of the town to match. For licensed medical professional (e.g., nurses and therapists) and medical support occupations (e.g., medical lab technicians and dental assistants) ultimately inhabited by community college students from the High School Class of 1992, for example, backgrounds in academic and applied science should be substantial. But, compared with those who became technicians, higher percentages of this group had been weighed down with remedial course work in English (31.8 percent; s.e. = 4.78) and precollegiate mathematics (53.3 percent; s.e. = 5.02), hence limiting full curricular opportunities in the community college setting. The result? "Less-than-optimum science." This dissonance argues for creative transitional (high school-to-community college) summer mathematics workshops in which the presentation of algebra and statistics can be situated in health services-related topics such as epidemiology. Such strategies are similar to what community and regional planners advise in spatial reorganization and transport systems so that residents (and visitors) maneuver more efficiently to and through the environment, moving on with "relative advantage" (Janelle 1972)**.**

There have been moments in this third portrait of community college students when the populations described resemble those of the second: the academic students look like the Tenants; the occupational students appear to be Homeowners; and the unclassifiable students behave as Visitors. But the portraits were drawn from very different temporal perspectives: the former at a tipping point of longer-term residence in the town looking both backward to secondary school history and forward to markers of final attainment, the latter looking from the final point of attainment in the town into subsequent academic and work life. One population was defined by credits, the other by credentials. As noted at the outset of this essay, these portraits, overlaying each other, are intended to provide a rich map of experience in the educational economy of the community college.

-VI-
The 'Cooling Out'/Diversion Critique Revisited

No matter which map we follow to trace the histories of traditional-age students who move into the town we call the community college, there are some enduring topics and questions that cut across the landscape. Foremost of these is the critique of the community college as sidetracking (imperceptibly, through placement testing, counseling, and orientation courses) otherwise promising students who "aspire"—or otherwise *might* "aspire"— to bachelor's and graduate degrees into dead-end occupational programs with no degree outcomes and lowering their education expectations along the way. In the classic work of this critique, Clark labeled the process "cooling out" (Clark 1960; 1980). The thesis of the deleterious diverting effects of community college attendance has persisted in the research literature, principally among those who see social capital formation as the primary goal of higher education (Karabel 1976; Pincus 1980; Lavin and Alba 1981; Brint and Karabel 1989; Heller and Schwartz 2002; Dowd 2003). This critique has been partially addressed by the three portraits, but some features of traditional-age community college student histories now require elaboration outside the portraits. All of them undercut or substantially modify the cooling out/diversion critique. To be fair to the critics, though, the populations and conditions of education have changed considerably since the 1960s and 1970s, the decades in which most of their studies were based.

Remediation and the Academic Momentum of Entering Community College Students

The community college does not serve the right-tail of academic preparation of secondary school students. This is an understatement, and something the cooling out/diversion critique rarely notices. When more than 60 percent of its entering traditional-age population requires some remediation—and nearly 20 percent in remedial reading—the community college faces considerable challenges in bringing even a modicum of its students through to credentials. Jenkins and Boswell (2002) point out that one of the reasons we see an increasing spread between remediation rates in community colleges and four-year institutions is that at least 10 states preclude or discourage public four-year institutions from offering remedial course work. While the most visible system policy developments of this type occurred after the history of the High School Class of 1992, the transcript evidence suggests that some of the changes in state policy took place between the 1980s and 1990s (for a corroborating analysis, see Shaw 1997). The proportion of those who started in four-year colleges who did *not* take any remedial course work increased from 56.4 percent for the High School and Beyond/Sophomore Cohort (1982–1993) to 74.7 percent for the NELS:88/2000 cohort (1992–2000), while the proportion of those who started in community colleges who did not require remediation remained relatively stable at 36.7 percent for the High School and Beyond/Sophomore Cohort versus 38.9 percent for the NELS:88/2000, a finding with parallel confirmation from institutional surveys (Zhang

2000).[57]

The fact that remediation did not play a role in logistic analyses of transfer and associate degree attainment for the long-term residents of community colleges (the Homeowners and Tenants), and that these two groups constituted over half of the traditional-age community college population, implies that community college remedial programs are working for a substantial proportion of their students. This story extends beyond the borders of this essay, is worth more rigorous research with large populations and specific types and levels of remediation, and should take account of (a) delay of entry and differential age distribution of entering community college students by race/ethnicity (the BPS:96/01 shows entering Latino students in community colleges as younger than whites and coming directly from high school at the same rate, and entering African-American students as older and less likely to begin postsecondary student immediately following high school graduation), and (b) the consequences of both delay of entry and age for different types of remedial work.

Degree Expectations of Community College Students Are Comparatively Varied

The community college does not encounter the right-tail of education "aspirations," either (see tables 4 and 5). But the measure of education expectations is more complex than the critics' analyses allow, and the objectives of those who enter community colleges are more diverse—and inconsistent with the student's academic background—than the classical configurations account. The town of the community college is distinct in its offering of occupationally oriented credentials; there are students who desire such credentials, and occupational program orientation is one of the principal reasons students choose the community college as the point of entry in postsecondary education. This choice factor may not have been true for the junior college population of the 1950s that Clark (1960) analyzed, but it certainly was prominent in the 1990s.

None of this means that students entering community colleges do not expect to earn bachelor's degrees, or that expectations don't count. But contrary to other analyses (e.g., Pascarella et al. 1998), early experience at the community college has a more positive impact on education expectations than the cooling out/diversion theses admit. This is a complex story, and a simple descriptive table does not do it full justice, but table 41 is offered (borrowed from Adelman, forthcoming) to indicate that the landscape of change in education expectations after matriculation for this population is not unidirectional.

Overall, 59 percent of this national traditional-age group of community college entrants maintained expectations for a bachelor's degree between the 12th grade and two years later, another 19 percent raised their expectations to the level of bachelors, and 7 percent lowered their expectations from a bachelor's degree. Differences by gender are minimal and not statistically significant. By race ethnicity, there were no statistically significant differences in the proportions raising or lowering expectations at or from the bachelor's level, but in terms of maintaining

[57] See Appendix C, table C-9, for the documentation of these remediation data.

bachelor's degree expectations, a lower proportion of whites and Latinos did so than African-Americans and Asians. This is not a monochromatic picture of deflation.

Table 41. Changes in education expectations between 1992 and 1994 for 1992 12th-graders whose first postsecondary institution was a community college and who entered through January of 1993, by gender and race/ethnicity

Change in expectations	All	Men	Women	White	Black	Latino	Asian
Raised expectations to bachelor's degree	18.9 (1.67)	17.8 (2.10)	19.9 (2.45)	19.6 (1.96)	14.6 (4.98)	19.9 (5.10)	11.5 (3.60)
Maintained expectations at bachelor's degree	59.4 (1.97)	64.0 (2.71)	55.1 (2.62)	58.6 (2.22)	70.5 (6.58)	51.8 (5.30)	74.2 (6.17)
Raised expectations to associate degree or two years of college	0.7 (0.16)	0.5 (0.20)	0.8 (0.25)	0.8 (0.21)	#	0.6 (0.38)	#
Maintained expectations at "some college"	8.5 (1.02)	6.6 (1.06)	10.3 (1.66)	8.2 (1.10)	4.2 (1.65)	15.2 (4.34)	1.8 (1.23)
Lowered expectations from bachelor's	7.2 (0.95)	6.0 (1.04)	8.3 (1.58)	7.1 (1.14)	8.9 (3.79)	6.6 (2.21)	7.5 (3.47)
Lowered expectations from associate or 2 years of college	3.0 (0.44)	3.2 (0.67)	2.8 (0.56)	3.3 (0.52)	0.1 (0.62)	2.4 (1.10)	4.4 (3.42)
Maintained expectations below associate or two years of college	2.3 (0.42)	1.8 (0.41)	2.8 (0.72)	2.4 (0.46)	0.8 (0.58)	3.4 (1.87)	0.7 (0.38)

Rounds to zero.
NOTES: Standard errors are in parentheses. Columns may not add to 100.0 percent due to rounding. Weighted N=579k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).

There are *Two* Distinct Outcomes for Long-term Residents of Community Colleges

Student performance in the histories of the residence trichotomy portrait indicates that there are two distinct outcome measures for the traditional-age population: transfer (with bachelor's degree attainment) and terminal associate degree in an occupationally oriented field. The community college does better with the first of these than the second. But those who earn associate degrees (occupational or academic) are more likely to find continuous employment than others, and those who earn occupational associate degrees are more likely to experience a higher degree of congruence between course of study and early occupation than others. Degrees count, yes, but the associate degree can—and should—be a greater part of the equation. The diversion we witnessed occurs *within* the histories of students who are occupationally oriented—and not arts and sciences oriented—to begin with, and that diversion involved first-year course taking. If we are not paying attention to discrete curricular choices and their consequences (Hagedorn et al. 2003), we miss the paths that carry students away from the landmarks that register progress through the economy of the community college town. It's not diversion as much as getting lost, and the historical critiques did not penetrate to that level of curricular experience. Path models of choice and consequence such as Boughan's (2000) are better ways to find these landmarks than what this essay has offered.

Bachelor's Degree Attainment

Given the two distinct outcomes in the histories of students who start out in community colleges, a separate account of bachelor's degree attainment is mandatory. This essay has included bachelor's degree attainment as a landmark in the presentations of each portrait of the populations who move through the settlement of the community college. At this point, one can return to the topic, in a logistic treatment, bringing to bear both standard demographic variables and features of academic history encountered in the portraits above.

The bachelor's degree completion rates for traditional-age community college transfer students who enter a four-year college any time after 10 community college credits and earn more than 10 credits from the four-year institution are very high. For the high school classes of 1972 and 1982, with 12-year and 11-year histories, the bachelor's degree completion rate for these "classic transfers" was 72 percent, and for the 8.5 year history of the High School Class of 1992, it was 62 percent (Adelman 2004, table 4.4, p 50).[58] Two successive Oregon state system six-year graduation rate studies in the 1990s showed community college transfers who entered four-year colleges with a minimum of 45 credits completing bachelor's degrees at the same 62 percent rate (Arnold 2001). A two-year study of 45,000 upper division community college transfers (with a minimum of 56 credits) to the California State University (CSU) system (1978–79 to1990–91) marked a 60.8 percent bachelor's degree attainment rate—versus 46.8 percent for a parallel group of 53,000 first time CSU "native" students (Garcia 1994)**.** While the initial universe was defined a slightly different way, and was further constricted to those who earned an A.A. degree, an eight-year Florida longitudinal study (1994–2002—roughly the same time period as that for the High School Class of 1992) of 6,200 transfer students yielded a 74 percent bachelor's degree attainment rate (Goodman, Copa, and Wright 2004). In counterpoint to the cooling out/ diversionary theories, these large national and state system studies tell a powerful and positive story about the success of community college *transfer* students.

But transfer students are not the sole subjects here. Table 42 tells the basic logistic story. The universe consisted of all students who started out in a community college, earned any credits

---

[58]The only statistically significant difference in the bachelor's degree attainment rate by race/ethnicity for transfer students from the High School Class of 1992 was between white students (62.1 percent; s.e. = 3.79) and Latino students (43.0 percent; s.e. = 7.67).

from a community college, and evidenced positive values for all variables in the model. Setting

a generous entry significance requirement of .2 for the logistic equation,[59] neither race/ethnicity, gender, second language background, nor first-generation college student status met the threshold criterion for inclusion. Nor did any of the three major forms of financial aid (grants, loans, and college work-study), though that, as previously noted, may be a by-product of weaknesses in the NELS:88/2000 data base. Nor did such postmatriculation dichotomous variables as earning an associate degree from a community college or remediation of any amount and any kind.

The experimental variables of attaining dean's list status at any time and academic probation or dismissal at any time were entered as proxies for academic performance. The dean's list variable was accepted by the logic of the model but its role fell just shy of statistical significance. The pejorative performance variable (academic probation or dismissal) did not satisfy the threshold requirements for inclusion. Continuous enrollment (the student is allowed one semester or two quarters of stopout, exclusive of summer terms, and is still considered continuously enrolled in an 8.5 year longitudinal study) was purposefully excluded from the model because its effects overwhelm other independent variables that may be significant enough in themselves to provide some guidelines for improving bachelor's degree completion rates for community college students.[60]

We met all of these variables in the course of the data portraits sketched above. One might hope that some of them would have turned out more prominently in the clarification of what makes for bachelor's degree completion among students who start out at community colleges, but we take the evidence, however it falls. The statistically significant variables in table 42 are highlighted in bold, though two of them are marginal and are not highlighted. While odds ratios are included in the table, the Delta-p statistic provides the messages.

Three features of student academic histories carry negative coefficients:

1. Twenty percent or more of all grades were withdrawals or no-credit repeats. This

---

[59]To remind the reader: the software program (in this case, SAS) has a default that allows into the logistic model any variable with a .95 confidence level ($p < .05$). The models in this study override this default by lowering the confidence level to .80 ($p \leq .20$), thus admitting more variables into the equation. The more generous threshold does not mean that the variables will ultimately turn out to be significant in the model. In draft versions of the logistic model, independent variables with *t* statistics less than 0.50 are dropped.

[60]For the eight-year Florida longitudinal study of students who entered community colleges in the fall term of 1994, earned an A.A. degree, and transferred to four-year institution, the number of terms of stop-out and part-time enrollment status were the most significant features (negative) in a multivariate analysis of bachelor's degree completion (Goodman, Copa, and Wright 2004). The construct of "part-time" is not used in this monograph as a consequence of two features of transcript-based student histories: (1) cases in which students may begin a term with a full credit load but withdraw from a sufficient number of credits to render them *de facto* part-time students, and (2) ambiguities and lack of standardization across the 2,500–3,000 institutions in the longitudinal studies samples as to what constitutes a "full-time" summer term when over 60 percent of traditional-age students attend during summer terms.

is a dichotomous variable. Crossing the 20 percent line reduces the probability of earning a bachelor's degree by over 50 percent, a very negative result.

2. High ratios of credits in occupationally oriented courses to all credits earned. This is a five-level variable with the highest level marking cases where more than 66 percent of the student's credits were in occupationally oriented courses (see table 31 for the ratio brackets of this variable). Each level of increase in the ratio reduces the probability of earning a bachelor's degree by 9 percent.
3. Earning less than 20 credits in the first calendar year of attendance. This is a dichotomous variable. Failing to reach 20 credits reduces the probability of bachelor's degree completion by roughly 15 percent. The statistical significance of this variable, however, is weak.

And three features of community college student academic histories (other than continuous enrollment, which was purposefully excluded from the logistic model) are positively associated with bachelor's degree completion:

1. Earning college-level mathematics credits at any time in postsecondary history, and at three levels (more than 4 credits, 1-4 credits, and 0 credits) again appears, this time, with each step forward, the probability of bachelor's degree completion increases by 13 percent.
2. Earning any credits during summer terms (a dichotomous variable, and a proxy for high octane persistence) increases the probability of completion by 20 percent.
3. Credits earned from community colleges themselves, set in three bands (30 or more, 11-29, and 10 or fewer), a feature that, in a different formulation, Lee and Frank (1990) demonstrated to be a modest contributor to transfer. Each step up the band increases the probability of earning a bachelor's degree by 19 percent. While the statistical significance of this variable is marginal at .10, it argues for becoming a long-term resident in the community college before moving to a four-year environment.

The model is very convincing in terms of the proportion of predicted probabilities (91.7 percent) and the goodness-of-fit indicator (G^2/df of 1.048—the closer to 1.0 the better). At the point of determining convincing explanations of long-term history, precollegiate background and activities up to the point of matriculation are likely to fade in importance (academic resources brought forward from high school, SES quintile, education expectations, and timing of entry to college).

How does one sum the message?: The probability of earning a bachelor's degree for traditional-age students who start out in a community college increases with the number of credits earned in community colleges, during summer terms, and in truly college-level mathematics courses. The probability decreases with a high ratio of credits in occupational fields to total credits earned, with an excessive proportion of course withdrawals and repeats, and (maybe, because the significance of the variable is marginal) with less than 20 credits earned in the first calendar year of attendance. Even though the fact of any remediation did not qualify for entry in the logistic model, three of these features are directly related to the nature and extent of remedial course work to which the student is assigned: low level of additive credits earned in the first calendar year, course withdrawals and repeats (which are over-represented in remedial courses[61]), and college-level mathematics (if students get stuck in precollegiate remedial mathematics courses, they will not acquire sufficient momentum in the kinds of mathematics required for bachelor's degrees in technical fields, business fields, and an increasing number of social science fields).

Table 42. Logistic account of factors in bachelor's degree completion by December 2000 for all 1992 12th-graders who started in community colleges and earned any credits from community colleges

Variable	Parameter estimate	Adjusted standard error	*t*	*p*	Odds ratio	Delta-p
Intercept	-8.5142	1.2224	-4.03	0.01		
College-level math	**0.7713**	**0.1656**	**2.69**	**0.02**	**2.16**	**0.129**
>20 percent withdrawal and repeat grades	**-3.0763**	**0.7163**	**-2.48**	**0.05**	**0.05**	**-0.516**
Ratio of occupational credits to all credits	**-0.5553**	**0.1358**	**-2.37**	**0.05**	**0.57**	**-0.093**
Any summer term credits	**1.1789**	**0.2902**	**2.34**	**0.05**	**3.25**	**0.198**
Community college credits	1.1439	0.3443	1.92	0.10	3.14	0.192
<20 credits earned in first year	-0.8750	0.2834	-1.79	0.10	0.45	-0.147
Dean's list	0.8283	0.2858	1.68	——	2.29	
Education expectations	0.3238	0.1521	1.23	——	1.38	
Academic Resources quintile	0.1871	0.1275	0.85	——	1.21	
Socioeconomic status quintile	0.1350	0.1069	0.73	——	1.15	
Employed on campus during first two years	0.5570	0.3738	0.86	——	1.75	
No delay of entry	0.6120	0.4130	0.86	——	1.84	

NOTES: Standard errors adjusted by design effect=1.73. Universe consists of all 1992 12th-graders who started in community colleges and were not missing values for any of the 12 variables in the model. Weighted N = 516k. $G^2 = 2144.55$; $df = 2046$; $G^2/df = 1.048$; $X^2(df) = 929.08(11)$ p = 0.0001. Proportion concordant predicted probabilities = 91.7 percent

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-

[61] See Adelman 2004, table 6.6, p.84.

402).

These features of the academic histories of community college students bearing on bachelor's degree completion invite researchers to look more closely not at gross levels of remediation, rather at types of remediation (see Appendix C, table C-9). That subject lies beyond this essay, but as it is one of the major missions of the community college, no matter how the populations of students are described (Bailey and Averianova 1999), it is worth more finely grained investigation.

An allied line of research was suggested by more than one reviewer of this monograph. Pre-enrollment characteristics may be entangled with discrete post-enrollment behaviors such as the proportion of W (withdrew without penalty) and NCR (our standardized abbreviation for no-credit repeat) grades or earning less than 20 credits in the first calendar year of attendance, and the logistic regressions with transfer, associate degree, and bachelor's degree attainment as outcomes may suppress these relationships. Therefore, it was proposed, these independent variables should be subject to their own multivariate analyses. In response to this suggestion, two other logistic regressions were run using the same population addressed in table 42: one with less than 20 credits in the first calendar year as the dependent variable (see Appendix C, table C-13), and one with excessive wirthdrawal and repeat grades as the dependent variable. While the goodness-of-fit indicators for these models were not encouraging and the statistical significance of the basic Intercept parameter was marginal, at best,[62] the results should be pursued in other ways because

> (a) minority status turned out to be a credible contributor to the explanation of falling short on credits in the first year; and
>
> (b) of all measures of high school background, class rank/GPA alone emerged to assist in the explanation, and its negative momentum was reflected in a dichotomous variable marking a student's presence in the lowest two quintiles of GPA in the first year of attendance, (which, in turn, was the strongest of associated independent variables).

As DesJardins, McCall, Ahlburg, and Moye (2002) have demonstrated, GPA is a convincing proxy for student effort, and if that proxy is weak in *both* high school and the first year of community college attendance, the effects will be difficult to overcome. Researchers concerned with postsecondary attainment in general—and traditional-age community college student attainment in particular—are encouraged to explore such topics as the momentum of GPA further, using more sophisticated models than those employed in this presentation.

---

[62] For the logistic model using less than 20 credits in the first calendar year as the dependent variable, the significance of the basic model parameter was $p = .02$, the goodness-of-fit indicator was 1.37, and the proportion of concordant predicted probabilities was 76.8. For the model using no-penalty withdrawals and no-credit repeats constituting 20 percent or more of all grades as the dependent variable, the basic model parameter failed to meet an even marginal level of significance (.10) in a two-tailed test with 10 degrees of freedom.

-VII-
Summary and Messages

The constellations of community college populations examined in this paper are intended to stimulate further research at both the institutional and system levels so as to provide richer guidelines for enrollment management, academic advising, cooperative undertakings with both secondary schools and four-year colleges,[63] and metrics for assessing sector effectiveness.

The portraits offered are principally academic, emphasizing such features of student histories as attendance patterns, credits earned in different contexts, remediation, course-taking, and credentialing. Where do they fit in the landscape of research literature?

To date, the outcomes research on community college populations can be configured in three sets of emphases:

1. In-process outcomes such as GPA, retention to the second term or the second year, social integration, student satisfaction with intellectual growth (see e.g., Strauss and Volkwein 2002);
2. Summative educational outcomes, including highest degree and transfer (see e.g., Dougherty 1994); and
3. Labor market outcomes (see e.g., virtually all of Grubb's work).

This study prefers summative educational outcomes as the primary metric, but adds the curricular content of the community college experience into the mix, and in such a way that we can track degree momentum from the 10th grade onward. In light of the increasing velocity of multi-institutional attendance dynamics, it also favors longer term measures of *student persistence* as opposed to short-term measures of *institutional retention*, hence favors utilizing National Student Clearinghouse data for tracking mobile students (Porter 2002; Romano and Wisniewski 2003).

The portraits offered here implicitly advocate an analysis that looks backward from the endpoints of the evidentiary history: the last month of a longitudinal study, the highest credential attained, labor market status after completion of postsecondary education. By looking backwards, and using the traces of human activity in transcript records and the evidence of self-reported histories in survey data, one can identify the dominant features of the paths that brought students to these end points. This is a typical inferential process of historical reconstruction (Connerton 1989). With a traditional-age population as the subject universe, one must acknowledge that these endpoints are not final. It is worth repeating that even though the data are old, analysts of the effect of community college attendance on labor market outcomes go back to the National

[63] In a different typology of community college missions, Bailey and Morest (2004) call this "vertical expansion" marked by focus on the traditional-age student.

Longitudinal Study of the High School Class of 1972 because the NLS-72 traced its universe to age 32 or 33, by which point one has enough history to be reasonably confident of analyses invoking occupation, earnings, number of jobs, and years of employment. Neither of the subsequent age-cohort longitudinal studies followed their students that far into adulthood.

To reiterate a point made at the outset of this essay, across the sum of the portraits and in terms of academic history, it is clear that there are six distinct traditional-age populations served by the community college, the first four of which start out in a community college:

1. A persistent group oriented toward traditional academic and occupational fields that establishes a path of attainment involving transfer and earning a bachelor's degree;
2. An equally persistent group oriented toward the intermediate occupational credentials awarded by community colleges that also establishes a path of attainment;
3. A group with weaker secondary school preparation that struggles to obtain a modicum of credits in the community college, then stops;
4. A group that basically withdraws on entry to the community college;
5. Temporary visitors who are based in other types of institutions, principally four-year;
6. A small population of undergraduate reverse transfers who, in the national data samples, evidence declining momentum toward credentials of any kind.

In terms of its accountability metrics, the community college is wholly responsible for the first three of these groups, and in a consolidated balance sheet. Inclusion of the fourth group is problematic, as these students do not attain even the status of tourists in the town. The temporary visitors deserve a separate page in the ledger, since the community college should mark whatever services are performed for them. The most difficult of these groups for accountability purposes consists of the reverse transfers, since they arrive in the town of the community college at unpredictable moments, and with experiences of varying length and quality in the four-year sector. The analyses in these pages suggest that institutions experiment with a separate page in the ledger for them, as well.

Messages

To recap some practical and practice-oriented messages and suggestions derived from the three portraits presented in this essay:

- An enormous amount of research seeking to describe or explain retention and attrition, attainment, transfer, and postcollege earnings is thrust at community college administrators, faculty, and trustees. The studies often highlight variables over which the community college has but modest control—gender, race/ethnicity, first-generation college status, SES, second language background, marital and parental status, and even (Leigh and Gil 2003) number of siblings**.** Even when these variables prove to be statistically significant in multivariate analyses, shy of aggressive, targeted recruitment there is nothing a community college can do to change them in order to produce less differential results. In the national data sets used in this study, only SES survived in some of the statistical models, and even then, not well.

- There are methods to adjust organizational performance measures for noncontrollable phenomena, but, as Stiefel, Rubenstein, and Schwartz (1989) point out, the selection of performance measures themselves is a task fraught with ambiguity that is often resolved by "[data] availability and ease of interpretation" (p.71),[64] and the list of noncontrollable phenomena—along with interaction effects—could be very long, indeed.

- One demographic variable makes an enormous difference in the distribution of virtually any postsecondary educational outcome or process—age at the time of first entry to a postsecondary institution—and both analyses of student populations and institutional reporting should either divide the population by age brackets or, in multivariate models, use age as an independent variable. It would be helpful—at both the institutional and state system level—if data reporting systems automatically disaggregated by age—age at entry to postsecondary education, age at transfer, and age at exit from the system, with or without a degree.

- On the other hand, some precollegiate attributes and performance indicators, such as the academic intensity of secondary school curriculum, are subject to change through creative cooperative undertakings with feeder secondary schools so that students' momentum comes closer to realizing their goals. This momentum carries into the critical first year of postsecondary attendance, in which institutional objectives are to minimize remediation and get students over the threshold of 20 additive credits. The most important objective in these efforts is moving students to and beyond algebra 2 in high school so that they all can complete at least one college-level mathematics course at the community college (Hoyt 1999b). The "math path" has become the template for the types of academic outcomes community colleges are called on to cite.

- Creative precollegiate approaches to the math path for occupationally oriented high school students that would also yield substantive dual-enrollment credits as down-payments toward crossing the 20-credit line by the end of the first calendar year of postsecondary enrollment might include (a) a construction cost-estimating course through which the student is brought through plane and solid geometry, algebra 2, and some elements of trigonometry, along with fluency in spreadsheet applications and (b) a basic statistics course grounded in epidemiological and other public health problems, coupled with basic programming in one of the major statistical software packages. The world has gone quantitative, and students have to match.

- In accelerating student momentum toward degrees or transfer, the histories we read tell us to treat the year as a calendar year, not an academic year. Successful students themselves use the summer terms (witness the Tenants), and rearrange their temporal furniture so as to attenuate stress in the other terms of the calendar year.

---

[64] For example, airlines might choose "percent on-time arrival" as a performance measure since that is what matters to their passengers. But judging the performance of a particular carrier in this matter depends on its route mix: long-haul versus short-haul and location of hubs. Common sense says that an airline operating principally short-haul flights with hubs in areas vulnerable to violent weather disruptions (e.g., blizzards and tornados) will not have as stellar an on-time arrival record as an airline relying more on nonstop transcontinental flights.

- Recognize that traditional-age students are transferring at ever higher rates, and that those who transfer after at least a semester at the community college earn bachelor's degrees at rates comparable to those who began at four-year colleges. With higher transfer rates, special care should be paid to credit-transfer issues to ensure the continued success of transfer students. Some of the newer models of transfer and articulation agreements seek to preclude the problem of credit transfer, but the jury is out on the empirical evidence. The whole landscape of credit-transfer calls for more analytic mapping than it has received to date.

- While community colleges are open-door institutions, the students who are most likely to become long-term residents, i.e., those who put the greatest demands on instructional resources and program delivery, come from the 21st-60th percentile (of total "Academic Resources") of those in the high school graduating classes who continue their education. To turn these students into either associate degree recipients, transferees, or both requires careful attention to academic processes and sequences. These include, but are not limited to, prematriculation "boot camps" in mathematics, flexible scheduling of "gateway" courses, monitoring credit loads, ensuring arts and sciences background work for occupationally oriented programs, tracking first calendar year additive credits, and so forth.

- When we looked at the first-year curriculum participation rates for the Homeowners and Tenants community college groups, the Homeowners came up light in the sciences. Even if the principal degree of this group is the A.A.S. in an occupationally oriented field, we do the knowledge content of work in mid-level technical fields no favors by short-changing science. Since some of these students will eventually seek a four-year degree, lack of science study in the community college will hamper their efforts at a later date. In a 1998 survey conducted by the Center for the Study of Community Colleges, only 46 percent of the institutions required course work in the life and physical sciences for "nontransfer" associate degree programs, compared to 100 percent for transfer programs (Zeszotarski 1999). Message: community colleges can expect more from and ensure more from their A.A.S. students.

- In all multivariate analyses extending beyond the first year of attendance, the ratio of no-penalty withdrawal (W) and no-credit repeat (NCR) grades proved to have a substantially negative impact on attainment. Institutions control grading policy, can set tighter temporal boundaries and conditions for no-penalty withdrawals, and limit the number of repeats (both of these grading phenomena involve duplicative costs, uncertainty in enrollment management, and blockages in access to particular courses and to the institution in general). In the longer term, tightening these policies can only benefit students.

- This essay has been shaped both by its data sources and the experience and wisdom of institutional research officers, who are closer to the academic and support service processes that can be changed to make a difference in both student progress and overall enrollment management. The essay cites their articles and papers frequently, and for good reason. Future research, in both substance and methodology, would benefit by taking cues from this body of work.

REFERENCES

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

Adelman, C. 2003. "The Story Lines of Multi-Institutional Attendance." Paper presented at the Annual Forum of the Association for Institutional Research, Tampa, FL.

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

Adelman, C. forthcoming. "The Educational 'Anticipations' of Traditional-age Community College Students." *Journal of Applied Research in the Community College.*

Alba, R. and Lavin, D. 1981. "Community Colleges and Tracking in Higher Education." *Sociology of Education,* vol. 54, pp. 223–237.

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, no. 1, pp. 56–80.

Allen, D. 1999. "Desire to Finish College: an Empirical Link Between Motivation and Persistence." *Research in Higher Education,* vol. 40. no. 4, pp. 461–485.

Allen, D. and Nora, A. 1995. "An Empirical Examination of the Construct Validity of Goal Commitment in the Persistence Process." *Research in Higher Education*, vol. 36, no. 5, pp. 509–533.

American Association of Collegiate Registrars and Admissions Officers 2002. *Academic Transcripts and Records: Survey of Current Practices.* Washington, DC: Author.

Arnold, J. C. 2001. "Student Transfer Between Oregon Community Colleges and Oregon University System Institutions." *New Directions for Community Colleges*, no. 114. San Francisco: Jossey-Bass. pp. 45–59.

Astin, A. W. 1993. *What Matters in College: Four Critical Years Revisited.* San Francisco: Jossey-Bass.

Bach, S. K. et al. 2000. "Student Attendance Patterns and Performance in an Urban Postsecondary Environment." *Research in Higher Education*, vol. 41, no. 3, pp. 315–330.

Bailey, T. R. 2002. "Community Colleges in the 21st Century: Challenges and Opportunities," in P.A.Gram and N. Stacey (eds.), *The Knowledge Economy and Postsecondary Education: Report of a Workshop* (Washington, DC: National Academy Press), pp. 59–75.

Bailey, T. R. and Averionova, I. E. 1999. *Multiple Missions of Community Colleges: Conflicting or Complementary*. New York: Community College Research Center.

Bailey, T. R. and Morest, V. S. 2004. *The Organizational Efficiency of Multiple Missions for Community Colleges.* New York: Community College Research Center.

Bean, J. P. 1980. "Dropouts and Turnover: the Synthesis of a Causal Model of Student Attrition." *Research in Higher Education*, vol. 12, no. 2, pp. 155–187.

Bers, T. H. and Smith, K. E. 1991. “Persistence of Community College Students: the Influence of Student Intent and Academic and Social Integration.” *Research in Higher Education*, vol. 32, no. 5, pp. 539–556.

Betts, J. R. and McFarland, L. L. 1996. “Safe Port in a Storm: the Impact of Labor Market Conditions on Community College Enrollments.” *Journal of Human Resources*, vol. 30, no. 4, pp. 741–765.

Blanco, C. 2004. *Knocking at the College Door: Projections of High School Graduates by State, Income, and Race/Ethnicity*. Denver, CO: Western Interstate Commission on Higher Education.

Borden, V. M. H. 1995. "Segmenting Student Markets With a Student Satisfaction and Priorities Survey." *Research in Higher Education*, vol 36, no. 1, pp. 73–88.

Borden, V. M. H. 2004. "Accommodating Student Swirl: When Traditional Students Are No Longer Tradition." *Change*, vol. 36, no. 2, pp. 11–17.

Boughan, K. 2000. *The Role of Academic Process in Student Achievement: An Application of Structural Equations Modeling and Cluster Analysis to Community College Longitudinal Data.* AIR Professional File #74. Tallahassee, FL: Association for Institutional Research.

Boughan, K. 2001. The Rocky Road to Graduation: an Academic Career Flow Model for Tracking Student Progress at Community Colleges. Paper presented at the annual conference of the Northeast Association for Institutional Research. Cambridge, MA.

Brawer, F. B. 1999. “The Liberal Arts.” *New Directions for Community Colleges*, no. 108. San Francisco: Jossey-Bass, pp. 17–29.

Brennan, J., Kogan, M., and Teichler, U. 1996. "Higher Education and Work: a Conceptual Framework." In Brennan, J., Kogan, M., and Teichler, U. (eds.), *Higher Education and Work.* London: Jessica Kingsley Publishers, pp. 1–24.

Brewer, P.B. et al. 1996. “Benchmarking Academic Credit and Noncredit Continuing

Education.” *Journal of Continuing Higher Education*. vol. 44, no. 1, pp. 2–11.

Brint, S. and Karabel, J. 1989. *The Diverted Dream: Community Colleges and the Promise of Educational Opportunity in America, 1900-1985*. New York: Oxford University Press.

Cabrera, A. F. 1994. "Logistic Regression Analysis in Higher Education: An Applied Perspective." In Smart, J.C. (ed.), *Higher Education: Handbook of Theory and Research*. New York: Agathon Press, pp. 225–256.

Carnevale, A. P. and Desrochers, D. M. 2001. *Help Wanted . . . Credentials Required: Community Colleges in the Knowledge Economy***.** Princeton, NJ: Educational Testing Service.

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.

Cejda, B. D., Kaylor, A. J. and Rewey, K. L. 1998. "Transfer Shock in an Academic Discipline: the Relationship between Students’ Majors and their Academic Performance." *Community College Review*, vol. 26., no. 3, pp. 1–13.

Chermayeff, S. and Alexander, C. 1965. *Community and Privacy*. New York: Doubleday.

Choy, S. P. 2002. *Nontraditional Undergraduates: Findings from the Condition of Education, 2002*. Washington, DC: National Center for Education Statistics.

Choy, S. P. and Premo, M. K. 1995. *Profile of Older Undergraduates, 1989–90*. Washington, DC: National Center for Education Statistics.

Clark, B. 1960. "The ‘Cooling Out’ Function in Higher Education." *American Journal of Sociology,* vol. 65, no. 3, pp. 569–576.

Clark, B. 1980. "The ‘Cooling Out’ Function Revisited." In Vaughan, G.B. (Ed.), *Questioning the Community College Role.* New Directions for Community Colleges, no. 32. San Francisco: Jossey-Bass, pp. 15–32.

Cofer, J. and Somers, P. 2001. “What Influences Student Persistence at Two-Year Colleges?” *Community College Review*, vol. 29, no. 3, pp. 56–75.

Cohen, A. M. 1994. "Analyzing Community College Student Transfer Rates." *New Directions for Community Colleges,* no. 86. San Francisco: Jossey-Bass, pp. 71–79.

Cohen, A. M. and Ignash, J. 1994. "An Overview of the Total Credit Curriculum," in Cohen, A.M. (Ed.), *Relating Curriculum and Transfer*. New Directions for Community Colleges, no 86.

San Francisco: Jossey-Bass, pp. 13–29.

Conklin, K. A. 1996. "Career and Educational Interests of High School Students: A High School-College Collaboration." *Journal of Applied Research in the Community College,* vol. 4, no.1, pp. 77–85.

Connerton, P. 1989. *How Societies Remember*. Cambridge (UK): Cambridge University Press**.**

Dellow, D. A. and Romano, R. M. 2002. "Measuring Outcomes: Is the First-Time, Full-Time Cohort Appropriate for the Community College?" *Community College Review*, vol. 30. no. 2, pp. 42–54.

De los Santos, Jr., A. G. and Wright, I. 1990. "Maricopa's Swirling Students. *AACJC Journal*, vol. 60, no. 6, pp. 32–34.

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.

Dougherty, K. J. 1992. "Community Colleges and Baccalaureate Attainment." *Journal of Higher Education*, vol. 63, no. 2, pp. 188–214.

Dougherty, K. J. 1994. *The Contradictory College: Conflicting Origins, Impacts and Futures of the Community College.* Albany, NY: State University of New York Press.

Dowd, A. C. 2003. "From Access to Outcome Equity: Revitalizing the Democratic Mission of the Community College." *Annals of the American Academy of Political and Social Science,* vol. 586, pp. 92–119.

Eaton, J. S. (Ed.) 1994. *Colleges of Choice: the Enabling Impact of the Community College*. New York: Oryx Press.

Education Commission of the States 2001. "Transfer and Articulation Policies," *State Notes*, February, 2001. Denver, CO: Author.

Ehrenberg, R. G. and Smith, C. L. 2004. "Analyzing the Success of Student Transitions from Two-year to Four-year Public Institutions Within a State." *Economics of Education Review*, vol. 23, no. 1, pp. 11–28.

Fredrickson, J. 1998. "Today's Transfer Students: Who Are They?" *Community College Review,* vol. 26, no. 1, pp. 43–54.

Frost, S., Chopp, R. and Pozorski, A.L. 2004. "Advancing Universities: The Global City as

Guide for Change." *Tertiary Education and Management*, vol. 10, no. 1, pp. 73–86.

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

Garcia, P. 1994. "Graduation and Time to Degree: A Research Note from the California State University." Paper presented at the annual forum of the Association for Institutional Research, New Orleans, LA.

Glass, J. C. Jr. and Harrington, A. R. 2002. "Academic Performance of Community College Transfer Students and 'Native" Students at a Large State University." *Community College Journal of Research and Practice*, vol. 26, no. 5, pp. 415–430.

Goel, M. B. and L'heureux, R. A. 2003. "Educational Objectives and Retention at Two Community Colleges." *Journal of Applied Research in the Community College*, vol. 11, no. 1, pp. 7–19.

Goodman, T. G., Copa, J. C., and Wright, D. L. 2004. "Is Eight Enough? A Longitudinal Look at the Progression of Community College Students Toward a Bachelor's Degree." Research presentation to the Annual Forum of the Association for Institutional Research, Boston, MA.

Grosset, J. M. 1993. "A Profile of Community College Stop-Outs." *Community College Review*, vol. 20, no. 4, pp. 51–58.

Grubb, W. N. 1989. "The Effects of Differentiation on Educational Attainment." *Review of Higher Education*, vol. 12, no. 4, pp. 349–374.

Grubb, W. N. 1991. "The Decline of Community College Transfer Rates: Evidence From National Longitudinal Studies." *Journal of Higher Education,* vol. 63, no. 2, pp. 194–222.

Grubb, W. N. 1992. "Postsecondary Vocational Education and the Sub-Baccalaureate Labor Market: New Evidence on Economic Returns." *Economics of Education Review*, vol. 11, no 3, pp. 225–248.

Grubb, W. N. 1996. *Working in the Middle: Strengthening Education and Training for the Mid-Skilled Labor Force.* San Francisco: Jossey-Bass.

Grubb, W. N. 1997. "The Returns to Education in the Sub-Baccalaureate Labor Market." *Economics of Education Review*, vol. 16, no. 1, pp. 1–15.

Grubb, W. N. 2002. “Learning and Education in the Middle, Part I: National Studies of Pre-Baccalaureate Education.” *Economics of Education Review*, vol 21, no. 2, pp. 299–321.

Guerin, K. 1999. “Measuring the Effects of Economic Change on Graduation, Transfer and Stopout Rates: An Application of Multiple Cohort Event History Analysis.” Paper presented at the Annual Forum of the Association for Institutional Research, Seattle, WA.

Guerin, K. 1997. “Tracking Student Exit, Transfer and Graduation: An Event History Analysis of Competing Risks.” Paper delivered at the Annual Forum of the Association for Institutional Research. Orlando, FL.

Guo, S. 2004. “Issues in the Development of a Model to Adjust the Transfer Rate: An Example of Adjusted Performance Measures.” Paper presented to the Annual Forum of the Association for Institutional Research, Boston, MA.

Hagedorn, L. S. and Castro, C.R. 1999. "Paradoxes: California’s Experience With Reverse Transfer Students." In *New Directions for Community Colleges*, no. 106. San Francisco: Jossey-Bass, pp. 15–26.

Hagedorn, L. S. et al. 2003. Course Shopping in the Urban Community College: An Analysis of Student Drop and Add Activities. Paper presented at the annual convention of the American Educational Research Association, Chicago, IL.

Halprin, L. 1963. *Cities*. Cambridge, MA: MIT Press.

Halprin, L. 1969. *The RSVP Cycles: Creative Processes in the Human Environment.* New York: George Braziller, Inc.

Heller, D. E. and Schwartz, D. R. 2002. "Challenges to Equity and Opportunity in Higher Education: An Analysis of Recent Policy Shifts." Paper presented at the Annual Conference of the Association for the Study of Higher Education. Sacramento, CA.

Hilmer, M. J. 1997. “Does Community College Attendance Provide a Strategic Path to a Higher Quality Education?” *Economics of Education Review*, vol. 16, no. 1, pp. 59–68.

Horn, L. J. and Berktold, J. 1998. *Profile of Undergraduates in U.S. Postsecondary Institutions, 1995-96.* Washington, DC: National Center for Education Statistics.

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

Hoyt, J. E. 1999a. "Remedial Education and Student Attrition." *Community College Review*, vol. 27, no. 2., pp. 51–72.

Hoyt, J. E. 1999b. "Level of Math Preparation in High School and Its Impact on Remedial Placement at an Urban State College." *College and University*, vol. 74, no. 3, pp. 37–43.

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

Hyers, A. D. and Zimmerman, A. 2002. "Using Segmentation Modeling to Predict Graduation at a Two-Year Technical College." *Community College Review*, vol. 30, no. 1, pp. 1–19.

Jackson, J. B. 1970. "The Stranger's Path." In Zube, E. H. (ed.), *Landscapes: Selected Writings of J.B. Jackson.* Amherst, MA: University of Massachusetts Press, pp. 92–106.

Jacobs, J. 1970. *The Economy of Cities.* New York: Random House.

Janelle, D. G. 1972. "Spatial Reorganization: a Model and a Concept." In Bell, G. and Tyrwhitt, J. (eds.), *Human Identity in the Urban Environment*. Hammondsworth (United Kingdom): Penguin Books, pp. 483–498**.**

Jenkins, D. and Boswell, K. 2002. *State Policies on Community College Remedial Education: Findings from a National Survey.* Denver, CO: Education Commission of the States.

Kane, T. J. and Rouse, C. E. 1995. "Labor Market Returns to Two- and Four-Year Colleges." *American Economic Review*, vol. 85, no. 3, pp. 600–614.

Kane, T. J. and Rouse, C. E. 1999. "The Community College: Educating Students at the Margin Between College and Work.: *Journal of Economic Perspectives*, vol. 13, no. 1, pp. 63–84.

Kazis, R. 2004. "Introduction," in Kasis, R., Vargas, J., and Hoffman, N. (eds). *Double the Numbers: Increasing Postsecondary Credentials for Underrepresented Youth.* Cambridge, MA: Harvard Education Press, pp. 1–15.

Keller, S. 1972. "Neighborhood Concepts in Sociological Perspective," in Bell, G. and Tyrwhitt, J. (eds.), *Human Identity in the Urban Environment.* Harmondsworth, UK: Penguin Books, pp. 276–289.

Kerr, C. 1963. *The Uses of the University*. Cambridge, MA: Harvard University Press.

Kuh, G. D. et al. 2001. *NSEE Technical and Norms Report.* Bloomington, IN: Indiana University Center for Postsecondary Research and Planning.

Laanan, F. S. 2003. "Degree Aspirations of Two-Year College Students." *Community College Journal of Research and Practice*, vol. 27, no. 6, pp. 495–518.

Laanan, F. S. and Sanchez, J. R. 1996. "New Ways of Conceptualizing Transfer Definitions." *New Directions for Community Colleges,* no. 96. San Francisco: Jossey-Bass, pp. 35–44.

LeBand, C. M. 1999. "Source and Information on the Scope and Impact of Reverse Transfers." *New Directions for Community Colleges,* no. 106. San Francisco: Jossey-Bass, pp. 85–91.

Lee, V. E. and Frank, K. A. 1990. "Students' Characteristics that Facilitate the Transfer from Two-Year to Four-Year Colleges." *Sociology of Education*, vol. 63, no. 3, pp. 178–193.

Leigh, D. E. and Gill, A. M. 1997. "Labor Market Returns to Community Colleges: Evidence for Returning Adults." *Journal of Human Resources*, vol. 32, no. 2, pp. 334–353.

Leigh, D. E. and Gill, A. M. 2003. "Do Community College Really Divert Students From Earning Bachelor's Degrees." *Economics of Education Review*, vol. 22, no. 1, pp. 23–30.

Li, K. K. and Gutierrez, A. 2004. Reverse Transfers and Student Swirling at an Urban Community College District. Paper presented to the 2004 Forum of the Association for Institutional Research, Boston, MA.

Lin, Y. and Vogt, W. 1996. "Occupational Outcomes for Students Earning Two-Year College Degrees: Income, Status, and Equity." *Journal of Higher Education*, vol. 67, no. 4, pp. 446–460.

Livi-Bacci, M. 1991. *Population and Nutrition: An Essay on European Demographic History.* Cambridge, UK: Cambridge University Press.

Lynch, K. 1960. *The Image of the City.* Cambridge, MA: MIT Press.

Lynch, K. 1976. *Managing the Sense of a Region.* Cambridge, MA: MIT Press.

Lynch, K. et al. 1977. *Growing Up in Cities: Studies of the Spatial Environment of Adolescence.* Cambridge, MA: MIT Press.

Machlup, F. 1980. *Knowledge: Its Creation, Distribution, and Economic Significance.* Princeton, NJ: Princeton University Press.

Maxwell, W. et al 2002. *The Community College Shuffle: Student Patterns of Multiple Enrollments.* Paper presented at the Annual Meeting of the American Educational Research Association, New Orleans.

Maxwell, W. et al. 2003. "Community and Diversity in Urban Community Colleges: Coursetaking Among Entering Students." *Community College Review*, vol. 30. no 4., pp. 21–46.

McCormick, A. C. 1997. *Transfer Behavior Among Beginning Postsecondary Students: 1989-1994.* Washington, DC: National Center for Education Statistics.

McGrath, D. and Spear, M. B. 1991. *The Academic Crisis of the Community College.* Albany:

SUNY Press.

McIntyre, C. 1999. *Enrollment Simulation and Planning.* Washington, DC: Community College Press.

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.

Moss, R. L. and Young, R. B. 1995. "Perceptions About the Academic and Social Integration of Underprepared Students in an Urban Community College." *Community College Review*, vol. 16, no. 4, pp. 47–61.

Murdock, T. et al. 1995. "Effect of Types of Financial Aid on Student Persistence Toward Graduation." Paper presented at the Annual Forum of the Association for Institutional Research. Boston, MA.

Napoli, A. R. and Wortman, P. M. 1998. "Psychosocial Factors Related to Retention and Early Departure of Two-Year Community College Students." *Research in Higher Education*, vol. 39, no. 4, pp. 419–455.

Ness, E. C. 2002. The Determinants of Satisfaction with Educational Experience: Why Community College Students Are More Satisfied. Paper presented at the annual conference of the Southern Association for Institutional Research. Baton Rouge, LA.

Palmer, J. 1999. "A Statistical Portrait of the Non-Liberal Arts Curriculum." *New Directions for Community Colleges*. No. 108. San Francisco: Jossey-Bass, pp. 31–38.

Pascarella, E. T. et al. 1998. "Does Community College Versus Four-Year College Attendance Influence Student Educational Plans." *Journal of College Student Development*, vol. 39, no. 2, pp. 179–195.

Pascarella, E. T. and Terenzini, P. T. 1991. *How College Affects Students*. San Francisco: Jossey-Bass.

Peng, C-Y, So, T-S H., Stage, F. K., and St. John, E. P. 2002. "The Use and Interpretation of Logistic Regression in Higher Education Journals: 1988-1999." *Research in Higher Education*, vol. 43, no. 3, pp. 259–293.

Petersen, T. 1985. "A Comment on Presenting Results from Logit and Probit Models." *American Sociological Review*, vol. 50. no. 1, pp. 130–131.

Piland, W. E. 1995. "Community College Transfer Students Who Earn Bachelor's Degrees."

Community College Review, vol. 23, no. 1, pp. 35–44.

Pincus, F. 1980. "The False Promises of Community Colleges: Class Conflict and Vocational Education." *Harvard Educational Review*, vol. 50, no. 3, pp. 332–361.

Porter, J., Hogan, M., and Gebel, M. 2000. "The Non-Linear Transfer Student: The Case of Transfer, Returning Transfer, Re-Transfer, and Co-Enrollment." Paper presented at the 40th Annual Forum of the Association for Institutional Research, Cincinnati, Ohio.

Porter, S. R. 2002. *Including Transfer-Out Behavior in Retention Models: Using the NSC Enrollment Search Data.* AIR Professional File No. 82. Tallahassee, FL: Association for Institutional Research.

Robinson, J. 1999. "The Time Diary Method: Structure and Uses." in Pentland, W. et al (ed.), *Time-Use Research in the Social Sciences.* New York: Plenum Publishers, pp. 47–90.

Romano, R. M. and Wisniewski, M. 2004. "Tracking Community College Transfers Using National Student Clearinghouse Data." Paper presented at the 45th Annual Conference of the Council for the Study of Community Colleges. Dallas, TX.

Rosenbaum, J. E. 1998. *Unrealistic Plans and Misdirected Efforts: Are Community Colleges Getting the Right Message to High School Students.* New York: Community College Research Center, Columbia University.

Roueche, J. E. and Roueche, S. D. 1994. "Responding to the Challenge of the At-Risk Student." *Community College Journal of Research and Practice*, vol. 18, no. 1, pp. 1–11.

Rouse, C. E. 1994. "What to do After High School? The Two-year vs. Four-Year Enrollment Decision." In R. Ehrenberg (ed.) *Contemporary Policy Issues in Education*. Ithaca, NY: ILR Press, pp. 59–88.

Rouse, C. E. 1995. "Democratization or Diversion? The Effects of Community Colleges on Educational Attainment." *Journal of Business Economics and Statistics*, vol. 13, no. 2, pp. 217–224.

Rouse, C. E. 1998. "Do Two-Year Colleges Increase Overall Educational Attainment? Evidence from the States." *Journal of Policy Analysis and Management*, vol. 17, no. 4, pp. 595–620.

Sanchez, J. R., Laanan, F. S., and Wisely, W. C. 1999. "Postcollege Earnings of Former Students of California Community Colleges: Methods, Analysis, and Implications." *Research in Higher Education*, vol. 40, no. 1, pp. 87–113.

Schuyler, G. 1999. “A Historical and Contemporary View of the Community College Curriculum.” *New Directions for Community Colleges*, no. 108. San Francisco: Jossey-Bass, pp.3–15.

Secolsky, C. 2002. The Influence of the Complexity of Student Educational Goals on Student Performance at Community College. Paper presented to the Annual Forum of the Association for Institutional Research, Toronto, Canada.

Secolsky, C. and Nazzaro, J. 2001. Case Studies of Community College Transfers Prior to Graduation. Paper presented to the Annual Forum of the Association for Institutional Research, Long Beach, CA.

Shaw, K. M. 1997. "Remedial Education as Ideological Background: Emerging Remedial Education Policies in the Community College." *Educational Evaluation and Policy Analysis,* vol. 19, no. 3, pp. 284–296.

Shaw, K. M., Valadez, J., and Rhoads, R. (eds.) 1999. *Community Colleges as Cultural Texts: Qualitative Explorations of Organizational and Student Culture.* Albany, NY: SUNY Press.

Snyder, T. D. 2003. *Digest of Education Statistics, 2002.* Washington, DC: National Center for Education Statistics.

Spicer, S. L. and Armstrong, W. B. 1996. “Transfer: the Elusive Denominator.” *New Directions for Community Colleges*, no. 96. San Francisco: Jossey-Bass, pp. 45–54.

Stiefel, L., Rubenstein, R., and Schwartz, A.E. 1999. "Using Adjusted Performance Measures for Evaluating Resource Use." *Public Budgeting and Finance*, vol. 19, no. 1, pp. 67–87.

St. John, E. P. and Starkey, J. 1995. “The Influence of Prices and Price Subsidies on Within-Year Persistence by Students in Community Colleges.” *Educational Evaluation and Policy Analysis*, vol. 17, no. 2, pp. 149–165.

Strauss, L. C. and Volkwein, J. F. 2002. "Comparing Student Performance and Growth in 2- and Four-year Institutions." *Research in Higher Education,* vol 43, no. 2, pp. 133–161.

Surette, B. J. 2001. “Transfer from Two-Year to Four-Year Colleges: an Analysis of Gender Differences.” *Economics of Education Review*, vol. 20, no. 2, pp. 151–163.

Szafran, R. F. 2001. "The Effect of Academic Load on Success for New College Students: is Lighter Better?" *Research in Higher Education*, vol. 42, no. 1, pp. 27–49.

Terenzini, P. T. et al. 1996. "First-Generation College Students: Characteristics, Experiences, and Cognitive Development." *Research in Higher Education*, vol. 37, no. 1, pp. 1–21.

Thomas, S. 1998. "Ties that Bind: a Social Network Approach to Understanding Student Integration and Persistence." *Research in Higher Education*, vol. 26, no. 1, pp. 115–129.

Thomas, S. L. and Heck, R. H. 2001. "Analysis of Large-Scale Secondary Data in Higher Education Research: Potential Perils Associated with Complex Sampling Designs." *Research in Higher Education*, vol. 42, no. 5, pp. 527–539.

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

Tinto, V. 1997. "Classrooms as Communities: Exploring the Educational Character of Student Persistence." *Journal of Higher Education*, vol. 68, no. 6, pp. 599–623.

Tinto, V. 1998. "Colleges as Communities: Taking Research on Student Persistence Seriously." *The Review of Higher Education*, vol. 21, no. 2, pp. 167–177.

Townshend, B. 2002. "Transfer Rates: A Problematic Criterion for Measuring the Community College." *New Directions for Community Colleges*, no. 117. San Francisco: Jossey-Bass. pp. 13–23.

Townshend, B. and Dever, J. 1999. "What Do We Know About Reverse Transfer Students?" *New Directions for Community Colleges*. no. 106. San Francisco: Jossey-Bass, pp. 5–14.

Tubbs. M. 1993. "Commitment as a Moderator of the Goal-Performance Relation: A Case for Clearer Construct Definition." *Journal of Applied Psychology*, vol. 78, no. 1, pp. 86–97.

VanderKelen, B. 1994. "Stability and Change in the Liberal Arts Curriculum," in Cohen, A.M. (ed.) *Relating Curriculum and Transfer*. *New Directions for Community Colleges*, no. 86. San Francisco: Jossey-Bass.

Velez, W. and Javalgi, R. G. 1987. "Two-Year College to Four-Year College: the Likelihood of Transfer." *American Journal of Education*, vol. 96. no. 1, pp. 81–94.

Ward, D. 1971. *Cities and Immigrants.* New York: Oxford University Press.

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

Wellman, J. V. 2002. *State Policy and the Community College–Baccalaureate Transfer.* Washington, DC: Institute for Higher Education Policy.

Whalley, P. and Barley, S. R. 1997. "Technical Work in the Division of Labor: Stalking the Wily Anomaly." In Barley, S.R. and Orr, J.E., *Between Craft and Science: Technical Work in U.S. Settings.* Ithaca, NY: Cornell University Press, pp. 23–52.

Zeszotarski, P. 1999. "Dimension of General Education Requirements." *New Directions for Community Colleges*, no.108. San Francisco: Jossey-Bass, pp. 39–48.

Zhang, X. Y. 2000. "National and Regional Profiles of Developmental/Remedial Education at Public Two-year Institutions." *Journal of Applied Research in the Community College*, vol 8 , no. 1, pp. 57–70.

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 have been completed:

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

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

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

Curtin, Ingels, Wu and Heuer (2002) offer a figure with a temporal presentation of the four longitudinal studies,[65] 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 *Moving Into Town—and Moving On*, 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

---

[65] 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).

included parents, teachers, and secondary school administrators. The cognitive tests administered in the 12th grade to the NLS-72 cohort were administered in the 10th and 12th grades to subsequent cohorts, thus enabling measures of intellectual growth. High school course-taking for the NLS-72 was summarized and reported by the school, whereas for the HS&B/Sophomore Cohort and NELS:88/2000 high school course-taking was derived directly from transcripts. And the postsecondary transcripts for the NELS:88/2000 were used to fill in missing information from the high school transcripts in that cohort. 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. Student financial aid information included an unobtrusive Pell Grant file for the HS&B/Sophomore Cohort, and that for the NELS:88/2000 included data from the National Student Loan Data System (though this file has not proven to be very helpful[66]).

Lastly, the shift from paper-and-pencil survey response forms to computer-assisted telephone interviews (CATI) in the1990s constricted the range of questions asked (e.g., there was no time to ask students about reasons for changing 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.

---

[66] See the brief discussion of financial aid data in the NELS:88/2000 in Adelman, C. *Principal Indicators of Student Academic Histories in Postsecondary Education, 1972-2000*. Washington, DC: U.S. Department of Education, 2004, p. 98.

APPENDIX B:
Technical Issues

Accuracy of Estimates and Standard Errors

There are different kinds of statistics in *Moving Into Town—and Moving On*, and all of them are estimates derived from student samples. Two kinds of error occur when samples are at issue: errors in sampling itself, particularly when relatively small subpopulations (for example, American Indians) are involved; and nonsampling errors. Even in surveys as large as the three grade-cohort longitudinal studies used in this monograph, sampling errors can affect estimates of statistical significance.

Nonsampling errors are more serious. A good example of a nonsampling 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 or 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; the information sent by the school was not really a transcript; or while the student may have enrolled at the school they never registered for courses and did not generate a record. In this case, we can mitigate the effect of missing transcripts by differential weighting of the population, and, indeed, for both the High School and 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 (see the discussion of weights and flags below). Weighting, though, will not address the panoply of nonsampling errors.

The effects of sampling and nonsampling errors ripple through databases. 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 the proportion of students who earned credits in an aggregate category of courses (e.g., table D-1, Appendix D), the questions are about nonrepetitive behaviors of the students who were sampled.

The descriptive comparisons in *Moving Into Town—and Moving On* dealing with non-repetitive student behaviors require invocation of the Students'*t* statistic to determine whether the difference between two independent estimates is significant. The formula for computing Students' *t* values is:

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

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 $p < .05$, a standard marker. For the judgments of statistical significance in all cross-tabulations in this document, an Excel template developed by MPR Associates for the production of reports to the National Center for Education Statistics, was used. Note that NCES no longer requires Bonferroni adjustments for multiple comparisons within independent variables of more than two categories, e.g., race/ethnicity.

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

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

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 here 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 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.

Flags and Weights

Each of the grade-cohort studies used in this monograph 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 very important for both the accuracy and meaningfulness of estimates.

For purposes of the topics covered, the oldest of the data sets, the NLS-72, is the least complicated. One weight was developed for the postsecondary transcript sample. This weight was based on the fourth 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 NLS-72 data use WT1 (weight) and set INPETS = 1 (flag). A separate flag for 12th-grade status in 1972 is not necessary because everyone in the NLS-72 was in the 12th grade in 1972.

For the postsecondary transcript sample of the High School and Beyond/Sophomore Cohort (HS&B/So), 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 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 storylines. This is a generous formulation for all likely postsecondary participants.

The second High School and Beyond/Sophomore weight involved the same procedure as the first but a more restrictive ratio applied 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 respectively.

To accompany these weights for the comparisons that hold the population to students who were in the 12th grade in 1982, a special flag, SENRFLAG, was constructed from variables in the HS&B/So that described student status in 1982. Using the given flag for participation in the 1982 cohort sample would be insufficient and not wholly accurate because not all students were in the 12th grade in 1982, e.g., students who graduated early from high school in 1981. But there were also students who were labeled “early graduates” on the data set (and thus candidates for exclusion from a 12th grade flag) whose high school graduation date was listed as 1982. Early graduates were excluded, and erroneously labeled “early graduates” were included in the population with SENRFLAG = 1. If these students were not participants in the 1982 panel (even if postsecondary transcripts were received) their weight = 0. Using the 1982 panel weight alone without this flag will not produce an accurate universe of 1982 12th-graders.

For all calculations of HS&B/So data in this document, SENRFLAG = 1, and the appropriate PSE weight were invoked.

The weights and flags for the NELS:88/2000 are more complex, still, because the cohort, established in the eighth 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 and Beyond/Sophomores were employed here, but in combination with the 12th-grade (second 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 when questions arise concerning the relationship between secondary school variables derived from high school transcripts and postsecondary variables derived from postsecondary transcripts.

The NELS:88/2000 weights used in *Moving Into Town—and Moving On* are:

F4F2P2WT	For all known postsecondary participants who were 12th-graders in 1992
F4F2HP2W	For all known postsecondary participants who were 12th-graders in 1992 and for whom high school transcripts are also part of the file
F4F2P3WT	For all postsecondary participants with complete records who were 12th-graders in 1992

As in the case of the High School and Beyond/Sophomore Cohort, a special flag was developed for 12th-graders in 1992. The existing flag on the NELS:88/2000 files excluded over 250 students who, in fact, were awarded high school diplomas in the spring of 1992 and who carry positive weights for the panel (the descriptive windows of the Electronic Code Book offer no reasons or clues for this anomaly). These students are included in the flag, GRADE12A, used in this monograph.

The weighted Ns for all samples used in a table are provided in the notes to the tables. 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.

Multivariate Analyses

For all multivariate analyses in this monograph, special procedures were employed in accordance with the complex sampling designs of NCES longitudinal studies (Thomas and Heck 2001).

For any model, an adjusted weight based on the population with nonmissing values on all variables in the model was calculated, in the following steps:

1. A weight appropriate to the question was selected. For example, for determinants of transfer from a community college to a four-year college, the weight for NELS

students with received postsecondary transcripts, F4F2P2WT, was chosen.

2. A simple tabulation of the dependent variable was then run for students who evidenced positive (non-missing) values for all variables in the model. Call this universe A. The selected weight was invoked.
3. The log of the program for step #2 produces both unweighted and weighted Ns for universe A.
4. The selected weight is then adjusted by what Thomas and Heck (2001) refer to as NORMWT, i.e., the weighted N / unweighted N of universe A.
5. The selected weight is then multiplied by the NORMWT.
6. The example would look as follows:

   F4F2P2WT / (f4f2p2wtA / unweighted N for A configuration of variables)

7. The result becomes a variable in its own right, a weight with a name, e.g., COREWT1.

For any model, a design effect (DEFT) based on the population with non-missing values on all variables in the model was calculated in order to adjust the standard errors produced by statistical packages such as SAS (used in the production of this study). The DEFT is calculated in three steps:

1. The requisite data for a simple standard error are produced by the same equation used for NORMWT, and set out as follows:

   $$\sqrt{\frac{p(1-p)}{N}} = \text{s.e.}$$

2. A matching Taylor series standard error is produced by AM software with the same dependent variable and equation, with the population filtered by positive (nonmissing) values for the same variables used in the equation in step #1. The Taylor series s.e. takes account of both stratum and primary sampling unit in combination with the weight selected, hence accounting for the complex sampling design.
3. The DEFT = Taylor Series s.e. / simple s.e.

Every discrete multivariate analysis has a unique DEFT. The DEFTs for the NELS:88/2000 are rather substantial, e.g. 1.83, reflecting not only the original sampling design in 1988 but also the successive "refreshings" of the sample in 1990 and (for the analyses in this monograph) in 1992. They are used to adjust the standard errors in the multi-variate analyses, and hence reduce the likelihood of over-estimating the effects of independent variables. The effect of the DEFT is also reflected in the production of the *F* and *t* statistics, for which the formulas used are:

$$\left(\frac{\beta}{\text{s.e. x DEFT}}\right)^2 = F$$

and

$$\sqrt{\frac{F}{}}$$

$$\sqrt{\text{DEFT}^2} \quad = \; t$$

In the logistic models employed in *Moving Into Town—and Moving On*, the level of significance of the *t* statistic—*p*— for a two-tail test is determined by reference to a standard table of critical values of *t* that can be found in any statistics textbook.

APPENDIX C:

Tables on Miscellaneous Topics Raised in the Text

Table C-1. Of 1992 12th-graders who began their postsecondary studies in a sub-baccalaureate institution, the percentage distribution by type of school first attended

Community college	89.1 (0.83)
Private not-for-profit associate degree granting	2.1 (0.37)
Private for-profit associate degree granting	3.4 (0.47)
Less than two-year hospital/medical specialty school	0.5 (0.14)
Public Area Vocational-Technical Institute (AVTI)	1.1 (0.23)
Private less than two-year for-profit technology school	0.4 (0.15)
Private less than two-year for profit cosmetology school	0.7 (0.13)
Private less than two-year for profit, mixed curriculum	2.5 (0.49)
Other less than two-year school	0.2 (0.03)

NOTES: Standard errors are in parentheses. Universe consists of all 1992 12th-graders whose first institution of attendance was sub-baccalaureate. Weighted N = 948k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Table C-2. Percent of all 1992 12th-graders who applied to a four-year college, by consistency of level of education expectations and quintile of high school Academic Resources

Level of consistency of education expectations	**Percent applying to a four-year college**				
	Quintile of high school Academic Resources[a]				
	Highest	Second	Third	Fourth	Lowest
Bachelor's consistent	91.6 (0.87)	79.5 (1.88)	65.8 (2.70)	57.6 (3.91)	27.7 (5.41)
Raised to bachelor's	77.7 (4.20)	64.5 (4.64)	53.9 (4.30)	39.2 (4.40)	16.5 (2.84)
Inconsistent or lowered	54.1 (14.4)	21.2 (4.72)	26.7 (4.65)	23.1 (4.16)	8.5 (2.02)
Some college	low-n	26.9 (10.5)	16.7 (8.57)	4.9 (1.33)	4.1 (1.24)
Sub-baccalaureate/or no college plans	low-n	11.4 (7.51)	4.3 (2.75)	1.4 (0.73)	2.3 (1.04)

[a] A combination index of curriculum, class rank/grade point average, and senior year score on a 90-minute enhanced

version of the SAT.
NOTE: Standard errors are in parentheses.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

The reader will note that students are very realistic in matching their initial postsecondary intentions to the strength of their academic momentum. Of those who consistently expected to earn a bachelor's degree and were in the highest quintile of Academic Resources, 92 percent applied to a four-year college, compared to 28 percent for those who consistently expected to earn a bachelor's degree but were in the lowest quintile of Academic Resources.

Table C-3. The empirical summer term community college curriculum of 1992 12th-graders based in four-year colleges who were incidental users of community colleges

Course category	Percent of all credits earned in summer terms at community colleges
Composition, writing	8.6
U.S. history, American civilization	7.8
Introduction to economics	7.5
Calculus	6.8
College-level mathematics[a]	5.8
Literature (all categories)	4.8
U.S. government	4.2
Data and computer applications	3.8
Oral communication and speech	3.8
Accounting (all levels)	3.3
Spanish language (all levels)	3.2
Chemistry (all)	3.0
General psychology	2.9
Biology elective courses	2.3
Physical education and health information	2.0
Total:	69.8[b]

[a] Includes finite math, college algebra, statistics, precalculus.
[b] In other words, about 70 percent of all credits earned at community colleges during summer terms by four-year college students were in these 15 course aggregates.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Table C-4. Remediation, course withdrawals and repeats, and grade point average during the first calendar year of attendance at a community college of 1992 12th-graders who started their postsecondary education in a community college, by number of credits earned in the first calendar year.

Credit production	First-year performance measures			
Number of credits earned in first year	Distribution of students by number of credits in first year (A)	Percent of (A) with no remediation	Percent of (A) repeating or withdrawing from more than two courses	Community college grade point average
0	**7.0 (0.87)**	49.5 (6.38)	45.0 (6.73)	1.91 (0.155)
0.1-10	**32.9 (1.67)**	42.0 (2.94)	22.3 (2.29)	2.17 (0.063)
10.1-19.9	**27.0 (1.60)**	44.2 (3.82)	19.0 (2.90)	2.46 (0.047)
20.0 or more	**33.0 (1.57)**	66.1 (2.25)	5.0 (1.59)	2.85 (0.025)

NOTES: Standard errors are in parentheses. Column for distribution of students may not add to 100.0 percent due to rounding. Weighted Ns: Earned 0 credits: 54k; earned 0.1-10 credits: 252k; earned 10.1-19.9 credits: 207k; earned 20 or more credits: 253k.

SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Table C-5. Bachelor's degree majors of 1992 12th-graders who were community college transfer student versus those who began in four-year colleges (degrees earned by December 2000)

Bachelor's degree major	Percent by attendance history	
	Community college transfers	"Native" four-year college
Business	19.4 (2.94)	16.6 (0.90)
Education	8.2 (1.28)	8.7 (0.65)
Engineering or architecture	5.1 (0.98)	8.5 (0.87)
Physical sciences	0.8 (0.34)	1.8 (0.36)

Mathematics or computer science	2.2 (0.61)	4.3 (0.65)
Life sciences	7.2 (1.88)	8.5 (0.59)
Health sciences and services	10.1 (1.80)	7.2 (0.61)
Humanities	5.7 (1.64)	7.3 (0.84)
Fine and performing arts	4.7 (1.09)	5.7 (0.64)
Social sciences	22.3 (3.17)	18.5 (1.00)
Applied social sciences	11.7 (1.98)	11.0 (0.84)
Other	2.6 (0.87)	1.9 (0.40)

NOTES: Standard errors are in parentheses. Columns may not add to 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Table C-6. Percent distribution of associate degree majors of 1992 12th-graders who started in and received the degree from a community college by December 2000, by community college residence history

Associate Major	Community college residence category of those who earned associate degrees from community colleges	
	Homeowners (30 or more credits and 60 percent or more of all credits were from CC) (Weighted N=134k)	Tenants (30 or more credits but <60 percent of all credits were from CC) Weighted N=69k)
Business	7.2% (1.25)	5.9% (1.74)
Business/financial		
services support	13.3 (3.71)	1.1 (0.66)
Computer-related	2.0 (0.67)	1.4 (0.74)
Engineering or technology	9.7 (2.89)	2.2 (1.39)
Health occupations	10.4 (1.76)	2.8 (2.25)
Science or math	2.6 (0.96)	5.6 (1.69)
Arts or applied arts	3.3 (0.92)	2.4 (1.08)
General studies	30.7 (3.69)	73.6 (4.33)
Education or human services	3.8 (1.48)	2.1 (1.41)
Protective services	8.0 (2.19)	2.4 (1.44)
Trades or precision	4.2 (1.60)	#

production		
Other	4.7 (1.98)	0.5 (0.36)

Rounds to zero.
NOTES: Columns may not add to 100.0 percent due to rounding. Standard errors are in parentheses.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (2003-402).

Table C-7. Distribution of certificates awarded to 1992 12th-graders through December 2000, by type of institution awarding the certificate and field of certificate

Awarding type of institution and field of certificate	**Percent of students earning certificates**		
	All students who earned certificates	Highest degree was a certificate	
Type of institution awarding certificate			
Four-year college	3.0 (0.60)	2.2 (0.39)	
Community college	33.7 (3.95)	30.3 (4.07)	
Other two-year college	25.0 (4.06)	27.1 (4.36)	
Less than two-year institution	38.3 (3.79)	39.9 (4.09)	
Field of certificate			Highest degree was a certificate from a community college
Business or office support	28.6 (3.48)	31.4 (3.79)	21.0 (6.98)
Personal services	10.1 (2.25)	7.7 (1.34)	3.7 (1.50)
Computer-related	3.2 (1.00)	2.8 (1.04)	0.6 (0.62)
Health or medical support	24.2 (3.86)	23.8 (4.12)	22.0 (3.67)
Mechanics and repair	14.9 (2.72)	15.7 (2.96)	20.3 (6.20)
Construction and precision production	6.5 (2.17)	6.7 (2.36)	12.7 (6.28)
Other	12.5 (1.99)	11.8 (2.06)	19.8 (4.36)

NOTES: Standard errors are in parentheses. Columns may not add to 100.0 percent due to rounding. Weighted N for all who earned certificates = 114k; for all whose highest degree was a certificate = 104k; for all whose highest degree was a certificate from a community college = 31k.
SOURCE: National Center for Education Statistics: NELS88\2000 Postsecondary Transcript Files (NCES 2003-402).

Table C-8 Ratio of grade point average (GPA) at community colleges to GPA at four-year colleges for 1992 12th-graders who started at a community college and transferred to a four-year college, by community college graduation

status

Community college graduation status	**Grade point average ratio of:**	
	All transfers	Transfers who earned bachelor's
Academic credential or program	1.07 (0.019)	0.99 (0.019)
Occupational credential or program	1.11 (0.047)	1.04 (0.052)
Unclassifiable program	1.04 (0.013)	0.97 (0.040)

NOTE: Standard errors are in parentheses.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

Table C-9. Percent of 1982 and 1992 12th-graders who rook remedial courses in postsecondary institutions, by type and intensity of remedial work, and by type of first institution attended

High school class and first institution of attendance	**Type and intensity of remedial work**				
	Any remedial reading	1-2 courses of remedial math only[a]	2 or more other remedial courses (not reading)	Only 1 other remedial course (not math or reading)	No remediation
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[b]	**10.6 (0.68)**	**10.9 (0.60)**	**13.2 (0.69)**	**6.7 (0.36)**	**58.6 (1.04)**
By type of institution first attended					
Class of 1982					
Four-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-baccalaureate	3.3 (0.89)	6.8 (1.34)	20.6 (2.40)	10.8 (1.92)	58.5 (2.93)
Class of 1992					
Four-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-baccalaureate	**6.6 (1.34)**	**12.7 (2.85)**	**19.9 (3.71)**	**9.1 (1.95)**	**51.7 (3.85)**

[a] A student with three or more remedial mathematics courses (but no remedial reading) is assigned to the category of "more than two other remedial courses."
[b] Data for the High School Class of 1992 is set in bold to facilitate comparison to that for the High School Class of 1982.
NOTES: 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. Rows may not sum to 100.0 percent because of rounding.. Standard errors are in parentheses.
SOURCES: National Center for Education Statistics: High School and Beyond/Sophomore Cohort (NCES 2000-194); NELS88/2000 Postsecondary Transcript Files (NCES 2003-402).

Table C-10. Percent of 1995-96 beginning postsecondary students whose first institution of attendance was a community college, and percent who ever attended a community college by 2001, by race/ethnicity and age in December 1995

Age and race/ethnicity	First institution of attendance: 1995-96			Ever attended a community college
	Four-year	Community college	Other sub-baccalaureate	
20 or younger				
All	51.2 (1.9)	40.6 (1.5)	8.2 (1.0)	51.3 (1.2)
White	52.2 (2.1)	41.5 (1.9)	6.3 (0.8)	51.3 (1.5)
African-American	45.9 (4.2)	39.1 (3.6)	15.0 (3.1)	50.8 (3.5)
Latino	42.4 (3.5)	43.2 (3.4)	14.5 (2.2)	54.4 (3.4)
Asian	73.5 (3.5)	23.8 (3.4)	2.8 (0.8)	42.9 (4.0)
American Indian	48.8 (13.3)	40.1 (14.7)	11.0 (5.6)	58.0 (11.5)
21-23				
All	19.9 (1.8)	50.8 (4.0)	29.3 (3.7)	61.4 (2.4)
White	20.5 (2.7)	55.9 (4.8)	23.6 (3.7)	65.6 (3.1)
African-American	13.7 (3.2)	41.2 (6.9)	45.1 (7.2)	57.0 (7.0)
Latino	21.3 (6.0)	47.3 (10.9)	31.4 (8.3)	50.2 (8.4)
Asian	27.6 (9.8)	46.3 (13.2)	26.1 (11.2)	Low N
American Indian	Low N	Low N	Low N	Low N

24-and up

All:	10.6 (1.0)	61.6 (2.3)	27.8 (2.1)	68.0 (2.7)
White	10.6 (1.2)	64.3 (2.5)	25.1 (2.1)	69.3 (3.1)
African-American	10.2 (2.3)	55.2 (8.3)	34.6 (7.0)	67.8 (7.6)
Latino	12.1 (3.3)	55.4 (7.9)	32.4 (6.7)	62.1 (9.0)
Asian	10.3 (4.5)	54.5 (13.1)	35.2 (11.4)	Low N
American Indian	Low N	Low N	Low N	Low N

NOTES: Standard errors are in parentheses. Rows for first institution of attendance may not add to 100.0 percent due to rounding.

SOURCE: Beginning Postsecondary Students Longitudinal Study, 1995-2001. Data Analysis System.

Table C-11. Selected demographic and secondary school background characteristics of 1992 12th-graders who became reverse transfer students versus those of other students who started in four-year colleges and those who started in and earned any credits from community colleges

	Reverse Transfers	Others who started in four-year colleges	Others who started in community colleges
Demography			
Race/ethnicity			
White	73.7 (4.97)	77.9 (1.24)	72.9 (2.02)
African-American	12.0 (3.93)	9.8 (1.02)	9.3 (1.30)
Latino	12.3 (3.88)	6.1 (0.63)	12.4 (1.55)
Asian	1.6 (0.57)	5.8 (0.60)	4.5 (0.71)
American Indian	0.6 (0.30)	0.4 (0.14)	0.9 (0.35)
Socioeconomic status quintile			
Highest	16.8 (5.47)	42.8 (1.39)	15.8 (1.39)
Second	14.6 (2.85)	25.1 (1.08)	26.5 (1.65)
Third	18.0 (2.93)	16.8 (0.90)	24.4 (1.47)
Fourth	28.4 (5.73)	10.3 (0.66)	19.9 (1.24)
Lowest	22.2 (4.91)	5.0 (0.48)	13.3 (1.41)
First generation college	28.3 (5.88)	14.0 (0.90)	27.3 (1.77)
Percent with grants or scholarships in first two-years of postsecondary	49.3 (5.17)	53.8 (1.18)	28.8 (1.54)
High School Background			
Highest math in high school			
Calculus or precalculus	21.3 (5.90)	44.1 (1.46)	7.8 (0.81)
Trigonometry	14.5 (3.78)	17.5 (1.13)	9.8 (1.07)
Algebra 2	33.5 (4.91)	28.9 (1.19)	35.9 (1.86)

Less than algebra 2	30.7 (6.15)	9.5 (0.74)	46.5 (1.83)
Average high school class rank/GPA quintile (1=highest; 5=lowest)	2.88 (0.157)	2.15 (0.029)	3.35 (0.043)
Average 12th grade composite test score quintile (1=highest; 5=lowest)	2.53 (0.178)	1.96 (0.028)	3.08 (0.050)
Average high school academic curriculum intensity quintile (1=highest; 5=lowest)	2.78 (0.147)	2.09 (0.031)	3.31 (0.041)

NOTES: Standard errors are in parentheses. Columns for race/ethnicity, socioeconomic status quintile, and highest math in high school may not add to 100.0 percent due to rounding. Weighted Ns: Reverse transfer = 95k; Other four-year = 1.03M; Community college = 748k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).

Table C-12. Relation between the ratio of credits in occupational areas to total credits earned to degree completion for 1992 12th-graders who started in community colleges, earned 30 or more credits from community colleges, and 60 percent or more of all credits from community colleges ("homeowners" group)

	Percent who earned:			Mean community college credits	**Percent of all**
	Associate	Bachelor's	Any degree		
Ratio of occupational credits to all undergraduate credits					
0	22.1 (3.93)	3.6 (1.18)	25.7 (3.97)	56.0 (3.34)	**20.6 (2.15)**
More than 0, less than 0.10	43.7 (5.22)	10.6 (2.22)	54.3 (4.84)	66.5 (1.86)	**26.5 (2.30)**
.10 to .33	36.1 (5.13)	12.7 (5.45)	48.8 (5.63)	68.6 (2.94)	**21.2 (2.31)**
.34 to .65	55.5 (5.02)	3.8 (1.36)	59.3 (4.88)	73.7 (1.86)	**19.1 (1.89)**
.66 or higher	30.3 (6.12)	#	30.3 (6.06)	58.8 (2.98)	**12.5 (1.70)**

Rounds to zero.
Notes: Standard errors are in parentheses. Column for "percent of all" may not add to 100.0 percent due to rounding. Weighted N = 278k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).

Table C-13. Logistic account of factors associated with earning less than 20 credits in the first calendar year of attendance by 1992 12th-graders who started at community colleges

Variable	**Parameter estimate**	**Adjusted standard error**	***t***	***p***	**Odds ratio**	**Delta-p**
Intercept	1.6925	0.3149	3.09	.02		
In lowest two GPA quintiles in first year	**1.3285**[a]	**0.1970**	**3.87**	**.01**	**3.78**	**0.366**
Race (minority)	**1.1362**[a]	**0.2619**	**2.49**	**.05**	**3.12**	**0.313**

More than one remedial course in first year	**0.9628[a]**	**0.2267**	**2.44**	**.05**	**2.62**	**0.265**
High school class rank/GPA quintile	-0.2940	0.0753	2.24	.10	1.77	0.081
Grant or scholarship in first two years	-0.6336[a]	0.1996	1.82		0.53	
Parent by age 20	1.0291[a]	0.3974	1.49		2.80	
No delay in entry	-0.6239[a]	0.2347	1.53		0.54	
Education expectations	-0.2071	0.1053	1.13		0.81	
On formal college work-study in first two years	-0.9448[a]	0.4962	0.79		0.39	

[a] Dichotomous variables.
NOTES: Statistically significant variables are highlighted in bold. Standard errors adjusted by design effect= 1.74. Universe consists of all 1992 12th-graders who started in community colleges and were not missing values for any of the nine variables in the model. Weighted N = 521k. G^2 = 2838.20; *df* = 2068; G^2/df =1.37; $X^2(df)$ =563.26(8); p = .0001; Proportion concordant predicted probabilities = 76.8 percent.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402 and Supplement).

[THIS PAGE IS INTENTIONALLY BLANK]

APPENDIX D:
Comparative Course Participation Rates of Community College Students

Table D-1. Percent of 1992 12th-graders whose first institution of attendance was a community college and who earned 30 or more credits from community colleges who successfully completed credits in 78 course aggregates, by highest degree earned

Course aggregate	**Percentage of students earning any credits in course aggregates**		
	Earned less than bachelor's	Earned bachelor's	Significant at p < .05
Percentage distribution	**70.4 (1.85)**	**29.6 (1.85)**	
Course Aggregate[a]			
Business Fields			
Accounting	24.5 (2.31)	27.9 (3.39)	
Finance	4.3 (1.21)	20.9 (3.34)	*
Marketing	9.6 (1.82)	23.3 (3.33)	*
Business information systems	5.2 (1.07)	18.9 (3.30)	*
Business: other	34.1 (2.37)	38.5 (3.62)	
Business Support			
Financial services support	13.9 (2.02)	7.7 (2.15)	*
Office occupations	28.7 (2.40)	13.3 (1.89)	*
Retail and specialty marketing	6.9 (1.29)	8.2 (1.55)	
Education/Human Services			

Special education	2.8 (0.89)	9.1 (2.11)	*
Teacher education subjects	6.4 (0.88)	21.6 (3.02)	*
Education: other	10.7 (1.54)	28.0 (3.22)	*
Family, child, and community studies	12.2 (1.43)	26.1 (3.09)	*
Crime studies and services	13.5 (1.75)	19.6 (3.01)	
Social work	2.4 (0.55)	7.7 (1.89)	*
Allied Health Services			
Health/physical education/recreation	4.2 (0.95)	16.5 (2.91)	*
Health services	25.6 (2.23)	23.7 (3.12)	
Nutrition	10.5 (1.25)	12.5 (1.97)	

See notes at end of table.

Table D-1. Percent of 1992 12th-graders whose first institution of attendance was a community college and who earned 30 or more credits from community colleges who successfully completed credits in 78 course aggregates, by highest degree earned–Continued

Course aggregate	Percentage of students earning any credits in course aggregates		
	Earned less than bachelor's	Earned bachelor's	Significant at $p < .05$
Computer-related			
Computer applications	42.9 (2.57)	42.5 (3.73)	
Computer programming	8.6 (1.61)	14.2 (2.69)	
Computer science	13.8 (1.76)	17.7 (2.74)	
Mathematics			
Precollege math[b]	57.4 (2.50)	53.0 (2.57)	
College-level math	43.4 (2.54)	74.0 (2.97)	*
Calculus and advanced math	7.3 (1.23)	24.9 (3.14)	*
Statistics (mathematics)	11.5 (1.52)	39.3 (3.82)	*
Mathematics: other	21.1 (2.19)	14.9 (1.98)	*
Social and economic statistics	1.7 (0.46)	12.4 (2.76)	*
Life Sciences			
General science	12.2 (1.89)	25.1 (3.51)	*
General biology	31.9 (2.44)	57.5 (3.45)	*
Biology service courses	13.5 (1.58)	17.8 (2.67)	
Biology: other	18.1 (1.90)	42.8 (3.53)	*
Agricultural sciences	2.0 (0.41)	8.5 (2.82)	*
Physical Sciences			
Chemistry	15.2 (1.86)	32.3 (3.66)	*

Geology	8.4 (0.96)	27.9 (3.02)	*
Physics	10.3 (1.82)	17.8 (2.55)	
Other physical sciences	11.0 (1.89)	22.9 (3.69)	
Humanities			
Spanish	15.9 (2.89)	27.7 (2.90)	*
Other foreign languages	7.4 (1.31)	18.0 (2.67)	*
Classics	4.2 (1.31)	11.9 (2.31)	*
Literature	23.4 (1.95)	68.0 (3.40)	*
General humanities	24.0 (2.54)	36.7 (3.31)	*
Ethics	8.7 (1.33)	32.5 (4.40)	*
Bible study	3.3 (1.17)	9.1 (2.12)	*
Philosophy and religious studies	24.1 (2.15)	54.6 (3.92)	*

See notes at end of table.

Table D-1. Percent of 1992 12th-graders whose first institution of attendance was a community college and who earned 30 or more credits from community colleges who successfully completed credits in 78 course aggregates, by highest degree earned–Continued

Course aggregate	Percentage of students earning any credits in course aggregates		
	Earned less than bachelor's	Earned bachelor's	Significant at $p < .05$
Social Sciences			
General social science	4.7 (0.96)	20.7 (3.87)	*
U.S. history	35.1 (2.49)	59.7 (4.21)	*
Ethnic studies	9.1 (1.38)	23.1 (3.01)	*
Women's studies	4.1 (0.88)	21.0 (3.11)	*
General psychology	60.3 (2.52)	80.5 (3.13)	*
Psychology: other	24.2 (2.22)	46.5 (3.93)	*
Anthropology	10.4 (1.20)	31.1 (3.55)	*
Introduction to economics	27.3 (2.30)	49.2 (3.51)	*
Economics: other	1.1 (0.36)	13.8 (3.19)	*
Geography	12.3 (1.66)	39.1 (3.68)	*
World or western civilization	18.0 (1.82)	41.3 (3.98)	*
History: other	4.9 (0.70)	25.7 (4.28)	*
U.S. government	26.6 (2.10)	46.0 (3.84)	*
Political science: other	3.7 (0.66)	14.3 (2.83)	*
Introduction to sociology	40.4 (2.37)	60.1 (3.56)	*
Sociology: other	15.9 (1.81)	41.8 (3.48)	*
Fine and Applied Arts			

Graphics, design	13.4 (1.80)	13.3 (2.37)	
Art history	15.4 (1.76)	23.2 (2.79)	*
Fine arts	12.6 (1.55)	25.2 (3.56)	*
Film	7.1 (1.79)	15.5 (2.80)	*
Performing Arts			
Theater	8.2 (1.29)	25.7 (2.98)	*
Music performance	4.4 (0.80)	8.7 (2.00)	*
Music: other	19.8 (2.00)	40.4 (3.66)	*
Communication Skills			
Oral communications	49.6 (2.57)	72.0 (3.33)	*
English composition	86.9 (1.68)	98.6 (0.78)	*

See notes at end of table.

Table D-1. Percent of 1992 12th-graders whose first institution of attendance was a community college and who earned 30 or more credits from community colleges who successfully completed credits in 78 course aggregates, by highest degree earned–Continued

Course aggregate	Percentage of students earning any credits in course aggregates		
	Earned less than bachelor's	Earned bachelor's	Significant at p < .05
Remediation Other Than Math			
Remedial English[b]	29.4 (2.32)	20.9 (3.18)	*
Other remediation (non-math)[b]	8.8 (1.45)	11.8 (3.20)	
Personal Development			
Physical education activities	58.7 (2.47)	86.5 (2.12)	*
Workplace skills	9.8 (1.29)	9.7 (2.33)	
Interpersonal skills	20.7 (2.14)	21.0 (2.83)	
Orientations	21.4 (2.46)	23.6 (3.53)	
Other			
Science, technology and society	1.9 (0.51)	9.9 (2.51)	*
Environment and natural resources	9.0 (1.70)	19.9 (2.75)	*
Communications: radio and television	5.2 (1.29)	16.8 (3.67)	*
Communications: other	10.9 (1.85)	21.3 (3.37)	*

[a] Course aggregates where participation rates among students whose first institution was a community college did not meet the threshold requirement of 7 percent in at least one of the two comparison groups include: agricultural business, agricultural production, forestry, architecture, journalism, personal services, electrical engineering, mechanical engineering, engineering: other, medical therapies, speech pathology/audiology, clinical health sciences, nursing, linguistics, building trades, precision production, transportation, mechanics/repair/installation, international relations, area studies, and public administration. These are not included in the 78 aggregate categories above.
[b] Most remedial courses do not carry additive credits. For purposes of the calculation that produced table 20, all passed remedial courses were granted 0.1 credits.
NOTES: Weighted Ns: Started in community college, earned more than 30 credits from community colleges but less than a bachelor's degree = 282k; started in community college, earned more than 30 credits from community colleges and earned a bachelor's degree = 121k. Standard errors are in parentheses.
SOURCE: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

APPENDIX E:
Financial Aid in the First Year of Attendance:
Highlights from the Beginning Postsecondary Students Longitudinal Study, 1995/96-2001

Table F-1 is a descriptive account of financial aid in the first year of attendance (1995–96) of traditional-age (20 or less) students in the BPS:96/01, by type of first institution. What are the highlights?

- Compared with those who started in both four-year colleges and other types of sub-baccalaureate institutions, community college students were less likely to apply for financial aid, and far less likely to receive grants or scholarships or take out loans of any kind.
- When those who started in community colleges received grants or scholarships or took out loans, the amounts involved were small when compared to those for students who started in both four-year colleges and other types of sub-baccalaureate institutions.
- Whether computed in terms of need-based aid or total financial aid, community college students received much less aid than students who began in other types of institutions.
- Few parents of dependent community college students took out PLUS loans, and the average amount of those loans could not be computed.

There are four key statistics for judging these phenomena, even in a descriptive presentation: the average cost of attendance in 1995–96, the proportion of beginning students who start out in California, and the ratio of net cost of attendance (total of tuition, transportation, housing, books and supplies, minus financial aid) to family income.

In 1995–96, the average total of tuition, room and board at all four-year colleges was $10,330; that at public two-year colleges was $4,217 (Snyder 2003, table 312, p. 354), or less than half of that for four-year schools. One in five students who started in community colleges did so in

California, where the average in-state community college tuition is $315 (compared to a national average in-state tuition for community colleges of $1,379), versus less than half that proportion for both four-year and other sub-baccalaureate schools (Snyder 2003, table 313, p. 356). The combination of these factors leads to a common sense conclusion: community college attendance is a lot cheaper than that for other types of institutions.

Cheaper, yes; but is it affordable to the population of those who attend? This is where the ratio of net cost to family income enters, with the distribution of beginning students by family serving as a gloss. For 72 percent of beginning four-year students and 76 percent of beginning community college students, the ratio of college net costs to family income was in the lowest quintile, i.e., the costs of attending the institution in question were affordable. But the distribution of family income between those two groups is different: the judgment of affordability is determined by income context. In all these regards, students attending other sub-baccalaureate institutions come from lower family income backgrounds and present financial aid profiles and histories that are much closer to those of students who begin in four-year institutions than do community college students.

Table E-1. Financial aid received during the first year (1995–96) of attendance by students 20 years old and younger, and ratio of net cost to family income, by type of institution attended in 1995–96

Features and conditions of financial aid	First institution of attendance		
	Four-year	Community college	Other sub-baccalaureate
Percent applied for financial aid	82.8 (0.8)	59.1 (2.9)	87.9 (2.6)
Parental contribution for dependent students	$8331 (282)	$4954 (508)	$3937 (506)
Percent received any grant or scholarship	62.9 (1.2)	35.7 (3.0)	62.2 (3.2)
Average grant award			
Federal amount	$1991 (36)	$1561 (73)	$1545 (63)
State amount	1888 (75)	1009 (87)	1998 (189)
Total grants	4613 (157)	1627 (97)	1965 (121)
Percent taking out any loan	48.0 (1.3)	11.3 (1.8)	56.9 (4.5)
Average amount of loan			

PLUS amount	$6592 (270)	Low N	$5382 (393)
Stafford and Perkins	2851 (32)	2194 (162)	3451 (188)
Percent receiving any work-study	15.9 (0.9)	3.7 (1.2)	2.0 (0.8)
Total need-based aid	$5601 (176)	$2076 (116)	$3196 (169)
Total federal plus state plus institutional aid	$6974 (194)	$2272 (116)	$4924 (300)

See notes at end of table.

Table E-1. Financial aid received during the first year (1995–96) of attendance by students 20 years old and younger, and ratio of net cost to family income, by type of institution attended in 1995–96–Continued

Feature and conditions of financial aid	First institution of attendance		
	Four-year	Community college	Other sub-baccalaureate
Self-reported credit hours in first year of enrollment:			
0-10	2.5 (0.4)	19.4 (1.9)	7.6 (2.4)
11-19	11.5 (0.9)	24.1 (1.8)	28.0 (3.6)
20-30	39.5 (1.5)	35.8 (2.8)	18.6 (2.5)
More than 30	46.5 (1.8)	20.7 (2.2)	45.9 (4.5)
First institution was in California	7.9 (1.1)	19.9 (2.5)	9.3 (1.9)
Ratio net cost of postsecondary education to family income			
Lowest quintile	71.9 (1.1)	75.6 (2.2)	45.6 (3.3)
Fourth quintile	16.9 (0.8)	12.6 (1.7)	20.1 (2.6)
Third quintile	3.7 (0.4)	3.5 (0.9)	9.1 (1.7)
Second quintile	2.0 (0.3)	0.8 (0.3)	4.0 (1.2)

Highest quintile	5.4 (0.5)	7.5 (1.5)	21.2 (2.3)
Distribution by family income in 1994			
Less than $20,000	18.4 (1.0)	24.8 (2.0)	51.0 (3.2)
20,000–30,000	10.2 (0.6)	12.3 (1.5)	14.1 (2.1)
30,000–50,000	21.1 (0.8)	26.1 (1.9)	19.4 (1.9)
Over $50,000	50.3 (1.4)	36.9 (2.3)	15.6 (1.6)

NOTES: Standard errors are in parentheses. Columns for self-reported credit hours and quintile of ratio of net cost to family income may not total 100.0 percent due to rounding.
SOURCE: National Center for Education Statistics: Beginning Postsecondary Students Longitudinal Study, 1995/96-2001, Data Analysis System.

[THIS PAGE IS INTENTIONALLY BLANK]

APPENDIX F:
First-to-Second Year "Retention" of Community College Students: The Critical Factor of Age at Entry

In his seminal work on college student attrition, Tinto (1987) made the following statement: "Within the 2-year sector, only 29.5 percent of the entering cohort will persist over a two-year period in *the institution in which they first register* [italics mine]" (p. 17). A careful reading of his table 2.4 (p. 18) shows that two years after entry, 69.8 percent of those who started in two-year institutions were still enrolled somewhere, and his note about those who were "system departures" allowed that some "will . . . re-enroll in college at a later date" (p. 19). Tinto was using the survey data from the grandmother of the grade-cohort national longitudinal studies, that for the High School Class of 1972. His statements and tables are measured, carefully phrased, and reasonable by any analyses of the NLS-72.[67] He was interested in isolating those students who truly left the system without earning credentials.

Somehow, in the subsequent literature, this basic description has been transformed into statements such as “over 50% [of] community college students leave during or after the first year” (Goel and L’heureux 2003). While it is difficult to determine precisely what that statement means (students who *start* in community colleges? if so, which ones? leave their first institution, even though they may turn up somewhere else? leave without a credential?), it is strong enough to attract a considerable amount of research energy to the phenomenon of first-year attrition, in

[67]Tinto estimated the "system completion rate" (by which he meant associate or bachelor’s degree) for 1972 seniors who started in two-year colleges to be 33 percent by 1979. Using the same definition, the transcript data for the NLS-72 show a 35.2 percent system completion rate (s.e. = 0.69) by June 1984. These are virtually indistinguishable estimates.

particular, to students who are there in the fall but not in the spring of the same academic year (e.g., St. John and Starkey 1995; Napoli and Wortman 1998; Cofer and Somers 2001). In the NELS:88/2000 cohort, 13.2 percent (s.e. = 1.20) of those whose first institution was a community college and who earned any credits from community colleges were enrolled for one calendar year or less. Sixty-three percent (s.e. = 1.69), on the other hand, were enrolled for more than three calendar years, and 53.2 percent of this group earned a credential of some kind (certificate, associate, bachelor's). Yes, the 13.2 percent who don't make it past the first year are important, but these data suggest that the whole issue deserves a more balanced treatment.

It is time to restore the boundaries which Tinto was trying to establish. Two very different national data bases—the Beginning Postsecondary Students Longitudinal Study of 1995/96–2001 and the NELS:88/2000, for which the basic postsecondary history runs from 1992 through 2000—tell almost exactly the same story: When one follows the student, and uses the full year as a reference frame, the first-to-second year "retention" rate (a) is very high, and (b) declines in a more-or-less direct relationship to the *age* of the student at the point of entry to the postsecondary system.

Table F-1. First to second year persistence of beginning postsecondary students in 1995–96, by type of first institution of attendance and age as of December 31, 1995

Age at end of 1995	Percent of 1995–96 students persisting from first to second year of attendance					
	Enrolled in 1996–97			Not enrolled in 1996–97		
	First institution of attendance			First institution of attendance		
	Four-year college	Community college	Other sub-bacc[a]	Four-year college	Community college	Other sub-bacc[a]
Less than 21	92.3 (0.7)	74.0 (2.5)	63.2 (4.0)	7.7 (0.7)	26.0 (2.5)	36.8 (4.0)
21-23	68.7 (5.1)	67.1 (6.3)	61.0 (6.0)	31.3 (5.1)	32.9 (6.3)	39.0 (6.0)
24-29	72.2 (9.0)	46.7 (9.1)	67.1 (5.6)	27.9 (9.0)	53.3 (9.1)	32.9 (.5.6)
30 and older	58.0 (5.4)	51.8 (7.5)	53.6 (4.3)	42.0 (5.4)	48.2 (7.5)	46.4 (4.3)

[a] Other sub-baccalaureate institutions.

NOTE: Standard errors are in parentheses.

SOURCE: National Center for Education Statistics: Beginning Postsecondary Students longitudinal study, 1995-

2001. Data Analysis System.

For both BPS:96/01 (survey-based) and the NELS:88/2000 (transcript based), the measure of retention or persistence is that having been enrolled *at any time* in year 1 at institution X, the student was enrolled *somewhere* (not necessarily at X) *at any time* in year 2. Setting aside the issue of the quality of a student's performance in year 1 (see Appendix C, table C-4 for an account of first-year credits earned, remediation, course withdrawals and repeats, and GPA for NELS students who started in community colleges), this is a true measure of the repetitive student behavior we call "persistence."

In the presentation of the BPS:96/01 data (table F-1), the population all started out in postsecondary education in the same year, and can be divided by age at a set point in time during that year. Among traditional-age (20 or younger) entering students in community colleges, 74 percent were retained in the postsecondary system from 1995–96 to 1996–97. That percentage drops precipitously in the age 24–29 group, and only at that point approaches the mythologic assertion concerning the proportion of community college students who leave in or after the first year.

In the presentation of the transcript-based NELS:88/2000 data (table F-2), months delay of entry after high school graduation is used as a proxy for age, and with students who earned certificates in their first year of attendance separated out. For those beginning in both four-year colleges and community colleges directly following high school graduation, the system retention rate is over 85 percent, but drops off sharply at the group delaying entry for 7- to 18-months following high school graduation, and declines even further for students delaying entry for more than 18 months. The lesson is clear again: age at entrance is a deciding force.

Table F-2. First-to-second year retention of 1992 12th-graders, by delay of entry to postsecondary education and type of institution first attended

Length of delay following high school graduation	Status in the second year		
	Retained	Not retained	Earned one-year certificates
No delay in entry			
Four-year college	95.7 (0.62)	4.2 (0.62)	#
Community college	86.9 (1.06)	12.7 (1.96)	0.4 (0.12)
Other sub-baccalaureate	73.2 (4.13)	12.4 (2.93)	14.4 (3.47)
7- to 18-month delay			
Four-year college	84.4 (3.74)	15.1 (3.67)	0.4 (0.45)
Community college	72.6 (4.44)	27.1 (4.43)	0.3 (0.22)

Other sub-baccalaureate	67.4 (8.53)	11.6 (4.09)	21.0 (7.79)
More than18-month delay			
Four-year college	80.1 (4.72)	19.9 (4.72)	#
Community college	62.7 (4.04)	37.1 (4.04)	0.2 (0.17)
Other sub-baccalaureate	69.1 (5.49)	18.8 (4.24)	12.1 (3.43)

Rounds to zero.
NOTES: Standard errors are in parentheses. Rows may not add to 100.0 percent due to rounding. Weighted Ns: four-year college = 1.1M; community college = 796k; other sub-baccalaureate institutions = 96k.
SOURCE: National Center for Education Statistics: NELS:88/2000 Postsecondary Transcript Files (NCES 2003-402).

[THIS PAGE IS INTENTIONALLY BLANK]

APPENDIX G:
Occupational Course Credit Clusters Used in the NELS:88/2000 Postsecondary Transcript Files

Cluster	Sample course categories included
Business and legal support occupations	Bookkeeping, office management, secretarial, data entry, general office software, para-legal, specialized office (legal, medical) support
Computer support and technical occupations	Data processing, business computer operations, computer technology, information technology, computer repair, computer applications in engineering technologies
Electronic and communications technical occupations	All course categories in communications technologies (multimedia, film, radio and TV, telecommunications), all categories in electronic engineering technologies (including solid state and semiconductor), basic electricity, communication electronics repair, industrial electronics
Construction technical and trades occupations	Civil technologies, drafting, surveying technologies, architectural technology; materials and methods of construction; heating and cooling technologies; all course categories under building

	trades; heating/ventilating/air conditioning (HVAC) installation, maintenance and repair
Industrial and mechanical technologies and trades occupations	Agricultural mechanics, water and wastewater technologies; industrial technologies; aeronautical technologies; mechanical design technologies; industrial/hydraulic/electromechanical equipment maintenance and repair; precision metal work; machine tool operation
Marketing, sales, retail, and hospitality occupations	Hotel and restaurant management, fashion marketing, beauty salon management, purchasing, retailing, sales and salesmanship, hospitality marketing and facilities, sports and entertainment marketing

Course credit clusters used in the NELS:88/2000 postsecondary transcript files–Continued

Cluster	Sample course categories included
Personal, food, and home services occupations	Cosmetology, funeral services, ornamental horticulture, landscaping, food production management, catering, culinary arts
Protective services occupations	All course categories under criminal justice (including penology, general police training, criminalistics, evidence, and other specialized criminal justice categories), fire protection systems, firefighting
Medical/health support occupations	All course categories under nursing, medical laboratory, dental assisting and hygiene, therapies (physical, occupational, art, movement, and respiratory), surgical technology, medical office management, mental health technology, alcohol and drug abuse treatment, nutrition and dietetics

Appendix H:
Occupation Codes Used for the NELS:88/2000 Postsecondary Transcript File (as Amended)

Code	General Occupation Category	Sample of Selected 1999 Job Titles as Provided by Panelists in the 2000 CATI[a]
1	Secretary	Secretary, receptionist, transcriptionist, appointment scheduler, office assistant
2	Sales clerk	Cashier, bank teller, sales clerk, counterman, store clerk, retail sales, food clerk, telemarketing
3	Data entry clerk	Data entry, report checker, imaging support clerk, label clerk, records coordinator
4	Other clerical	Shipping clerk, order writer, receiving clerk, letter carrier, dispatcher, library helper, warehouse clerk
5	Farmer, agricultural worker	Farmer, fruit picker, forester, feed lot manager, poultry housekeeper, hog tender, vineyard manager, commercial fisherman, nursery manager, ranch hand

6	Personal service	Hair stylist, waiter/waitress, daycare or child care provider, bartender, nail technician, hostess, mortician, flight attendant, butler, blackjack dealer, tatoo artist
7	Chef, cook	Pastry chef, dietary cook, pizza maker, line cook, cake decorator
8	Laborer	Materials handler, groundskeeper, shelf stocker, parking lot attendant, housekeeper, street cleaner, dishwasher, car detailer, bagger
9	Mechanics and repair	Automotive technician, brake specialist, repair farm equipment, collision repair, aircraft maintenance technician, phone service technician, HVAC installer
10	Crafts	Carpenter, plumber, electrician, jeweler, weaver, silversmith, mason, painter, cabinet maker, roofer, framemaker, jeweler

Code	General Occupation Category	Sample of Selected 1999 Job Titles as Provided by Panelists in the 2000 CATI[a]
11	Skilled operative	Toolmaker, machinist, camera operator, welder, electronic assembler, printer, production tech, weaver, seamstress, lithographer
12	Transport operative	Truck driver, subway motorman, delivery, conductor, switchman, fork lift operator
13	Protective service	Police, fireman, security guard, investigator, corrections officer, jail supervisor, crossing guard, store detective, parole officer
14	Military	Infantry, artillery officer, naval warfare crewman, army logistics, air force lieutenant, mortarman, platoon leader
15	Business support	Accounting clerk, payroll administrator, claims adjuster, title processor, medical billing, bookkeeper, loan processor, property manager, contract specialist, credit processor
16	Financial service professional	CPA, investment banker, stock broker,

		investment/financial analyst, controller, risk analyst, financial officer, auditor
17	Sales or purchasing	Account representative, marketing director, salesman, merchandiser, advertising manager, distributor, buyer, real estate agent, radio sales, corporate sales, purchasing agent, purchasing analyst, importer
18	Customer service	Parts specialist, customer support, customer goodwill operations, consumer protection auditor, service advisor, order fulfillment, courtesy officer, travel agent, service representative
19	Legal professional	Lawyer, law clerk
20	Legal support	Paralegal, legislative assistant/liaison, legislative analyst
21	Medical practice professional	M.D., dentist, veterinarian, psychiatrist

Code	General Occupation Category	Sample of Selected 1999 Job Titles as Provided by Panelists in the 2000 CATI
22	Medical licensed professional	Registered nurse, physical therapist, occupational therapist, dietician, pharmacist, optician, speech/language pathologist, chiropractor
23	Medical services	Medical lab tech, radiological tech, respiratory tech, dental hygienist, therapy supervisor, animal care specialist, sonographer, paramedic, certified nurse assistant, optician
24	School teacher	Teach high school history, teach fourth grade, teach science, teach middle school language arts
25	Other education or training	College professor, special ed helper, teacher aide, adult English as a Second Language (ESL) teacher, corporate trainer, pre-school teacher, piano teacher, Sunday School

		teacher, resident student advisor, graduate student teaching assistant, teach farm management, technical training specialist
26	Human service professional	Social worker, clergyman, case worker, counselor, rehabilitation specialist, behavior therapist, clinical psychologist, youth counselor
27	Engineer, architect	R&D engineer, academic engineer, mechanical engineer, civil engineer, architect, electronic design engineer
28	Scientist, statistician	Labor market statistician, data analyst, chemist, microbiology research, environmental scientist, archaeologist
29	Research assistant or lab tech	Research technician, research interviewer, museum assistant, food research evaluation, engineering assistant, survey taker

Code	General Occupation Category	Sample of Selected 1999 Job Titles as Provided by Panelists in the 2000 CATI[a]
30	Technical: other	Air pilot, process control technician, drafting and CAD, technical trouble-shooting: telecomm, metrology technician, hydrologic technician, environmental specialist, technology manager, map analyst, audio engineer
31	Computer systems professional	Information systems consultant, UNIX system administrator, network administrator, Web designer, senior systems engineer
32	Computer programmer	Software designer, software systems programming, anti-virus programming, software proofreader, programming analyst
33	Computer equipment operator	E-mail system operator, computer support repair, computer technician, software installer, network technician
34	Editor, writer, reporter, media	News coordinator, public relations writer,

	production	associate content/delivery producer, online editor/writer, script reviewer, business writer, sports writer, technical writer, documentary editor, grant writer, public affairs officer, publications director, news anchor
35	Performer, artist, entertainer	Art director, musician, church organist, actor, professional athlete, portrait artist, photographer, disc jockey, dancer, photographer, stage manager
36	Manager: executive	Chief financial officer, vice president, chief executive officer
37	Manager: midlevel	Store manager, restaurant manager, clinic manager, construction manager, branch administrator
38	Supervisor, coordinator	Foreman, director, assistant manager, supervisor, coordinator, crew leader, shift manager, assistant field administrator, project manager, logistics coordinator

Code	General Occupation Category	Sample of Selected 1999 Job Titles as Provided by Panelists in the 2000 CATI[a]
39	Health and recreation services	Athletic director, park manager, health club trainer, aerobics instructor, camp assistant director, golf course superintendent, athletic trainer, basketball coach, skiing instructor
40	Design and graphic communication	Graphic artist, publications designer, advertising designer, display designer, computer graphics artist, document imaging specialist, interior space designer
41	Human resource development or personnel management	Benefits manager, staffing coordinator, technical recruiter, personnel officer, human resources director
42	Administrative assistant	Administrative assistant, intern

[a] Computer Assisted Telephone Interview.

[THIS PAGE IS INTENTIONALLY BLANK]

Appendix I:

Congruent Combinations of Field of Study and Occupation, by Degree Level: NELS:88/2000 Longitudinal Study

Field of Study/Major or Other Indicator	Degree Level	General Occupation Description
Agriculture, natural resources, forestry	Bachelor's	Farmer, agricultural worker
Accounting	Bachelor's	Financial service professional Sales or purchasing Manager: executive Manager: midlevel
Management	Bachelor's	Financial service professional Sales or Purchasing Manager: executive Manager: midlevel
Other business (marketing,	Bachelor's	Sales or purchasing

human resource development)		Personnel management Financial service professional Manager: executive Manager: midlevel
Economics, finance	Bachelor's	Sales or purchasing Financial service professional Manager: executive Manager: midlevel
Education, child study	Bachelor's	School teacher Other education or training, Human service professional
Engineering or architecture	Bachelor's	Engineer Architect Technical: other Computer system professional
Engineering technology, Communications technologies	Bachelor's	Operative Engineer Technical: other

Field of Study/Major or Other Indicator	Degree Level	General Occupation Description
Information technology Computer science	Bachelor's	Research assistant Technical: other Computer system professional Computer programmer Computer equipment operator Engineer
Allied health, health or medical therapies, nutrition	Bachelor's	Medical licensed professional Medical services Laboratory technician
Nursing	Bachelor's	Medical licensed professional Medical services
Speech pathology, public health, clinical psychology	Bachelor's	Medical licensed professional Medical services Human service professional

Biological sciences, Clinical health sciences, Biochemistry, biopsychology	Bachelor’s	Scientist Medical licensed professional Medical services Research assistant or lab tech
Physical sciences, integrated general science	Bachelor’s	Scientist Research assistant or lab tech Technical: other
Mathematics, statistics, Operations research	Bachelor’s	Statistician Computer systems professional
English, letters, philosophy, humanities	Bachelor’s	Editor, writer, reporter
Writing (journalism, technical creative)	Bachelor’s	Editor, writer, reporter Artist
Recreation, sports studies, Health/physical education/ recreation (HPER)	Bachelor’s	Medical services Professional athlete Recreation services School teacher (if certified)
Religious studies, theology, Bible studies	Bachelor’s	Human service professional

Field of Study/Major or Other Indicator	Degree Level	General Occupation Description
Performing arts	Bachelor’s	Performer or artist School teacher (if certified) Other education or training
Visual arts/design	Bachelor’s	Design/graphic communication Artist
Public services, protective services, human services	Bachelor’s	Protective service Human service professional
Psychology	Bachelor’s	Human service professional Human resource development or personnel management
Communications. Film, radio/TV	Bachelor’s	Editor, writer, reporter Media director, producer, writer

Sociology, Anthropology	Bachelor's	Human service professional
Business	Associate	Sales or purchasing Financial support Financial service professional Customer service Manager: executive Manager: midlevel
Arts or applied arts	Associate	Performer or artist Design/graphic communication
Journalism or communications	Associate	Editor, writer, reporter
Business/financial services support Paralegal	Associate	Legal support Secretary Sales clerk Data entry clerk Human resource development Administrative assistant Sales or purchasing Financial service professional Customer service

Field of Study/Major or Other Indicator	Degree Level	General Occupation Description
Computer-related, technology	Associate	Engineer Research assistant or lab tech Technical: other Computer systems professional Computer programmer Computer equipment operator
Computer-related	Associate	Financial services support
Health services	Associate	Medical licensed professional Medical services
Air transport	Associate	Transport operative Technical: other

Education, human services	Associate	Education: other Human service professional Teacher
Protective services, Administration of justice	Associate	Protective service Military
Trades, precision production	Associate	Mechanics and repair Craftsman Skilled operative
Science	Associate	Medical licensed professional
Culinary arts, food management	Associate	Chef, cook, baker
Communication technologies	Associate	Skilled operative Technical: other
Secretarial/clerical, Other business support	Certificate	Secretary Sales clerk Data entry clerk Other clerical
Cosmetology Other personal services	Certificate	Personal services

Field of Study/Major or Other Indicator	Degree Level	General Occupation Description
Med/vet lab tech/assistant Dental assistant, dental hygiene Practical nursing (LPN) Respiratory therapy, radiologic technology, other allied health	Certificate	Medical services
Administration of justice Fire science	Certificate	Protective services
Mechanics and repair: automotive, air, electronic, HVAC, other	Certificate	Mechanics and repair
Precision production	Certificate	Skilled operative

Air transport	Certificate	Transport operative Technical: other
Other transport	Certificate	Transport operative
Graphic/print communication Graphic/industrial design	Certificate	Design/graphic communication
Culinary arts, food management	Certificate	Chef, cook
Paralegal	Certificate	Legal support
Agricultural business, Business administration, Marketing and distribution, Hospitality management, Accounting	Certificate	Business support Financial service professional Sales or purchasing Customer service Manager: executive Manage: midlevel
Information technologies, Computer programming, Data/information management, Engineering technologies	Certificate	Technical: other Computer system professional Computer programmer Computer equipment operator

Field of Study/Major or Other Indicator	Degree Level	General Occupation Description
Business	None, but 30-60 credits	Manager: executive Manager: midlevel Financial service professional Sales or purchasing Customer service Personnel administration
Arts or applied arts	None, but 30-60 credits	Performer or artist Design/graphic arts
Business/legal support	None, but 30-60 credits	Secretary Sales clerk Data entry clerk

		Other clerical Business support Legal support
Computer-related, Engineering technology, Science	None, but 30-60 credits	Engineer Scientist, statistician Research assistant or lab tech Technical: other Computer systems professional Computer programmer Computer equipment operator
Health occupations	None, but 30-60 credits	Medical licensed professional Medical services
Theology/divinity	None, but 30-60 credits	Human services professional
Journalism, communications writing	None, but 30-60 credits	Editor, writer, or reporter
Education, human services	None, but 30-60 credits	Education other than K-12 Human service professional
Administration of justice Fire science	None, but 30-60 credits	Protective services
Mechanics and repair: automotive, air, HVAC, electronic, other	None, but 30-60 credits	Mechanics and repair Crafts Skilled operative, transport operative
Field of Study/Major or Other Indicator	Degree Level	General Occupation Description
Cosmetology Other personal services	None, but 30-60 credits	Personal services
Child development and guidance	None, but 30-60 credits	Personal services
Communications technologies	None, but 30-60 credits	Skilled operative Technical: Other
Construction	None, but 30-60 credits	Crafts

Precision production	None, but 30-60 credits	Skilled operative
Air transport Other Transport	None, but 30-60 credits	Transport operative Technical: other
Recreation Health/physical education/ recreation (HPER)	None, but 30-60 credits	Recreation Health services
Psychology	None, but 30-60 credits	Human resource development Personnel management

-177-