NCES
National Center for Education Statistics

PEDAR

U.S. Department of Education
Institute of Education Sciences
NCES 2005–152

Waiting to Attend College

Undergraduates Who Delay Their Postsecondary Enrollment

Postsecondary Education Descriptive Analysis Report

THIS PAGE INTENTIONALLY LEFT BLANK

National Center for Education Statistics

U.S. Department of Education
Institute of Education Sciences
NCES 2005–152

Waiting to Attend College

Undergraduates Who Delay Their Postsecondary Enrollment

Postsecondary Education Descriptive Analysis Report

June 2005

Laura Horn
Emily Forrest Cataldi
Anna Sikora
MPR Associates, Inc.

C. Dennis Carroll
Project Officer
National Center for Education Statistics

U.S. Department of Education
Margaret Spellings
Secretary

Institute of Education Sciences
Grover J. Whitehurst
Director

National Center for Education Statistics
Grover J. Whitehurst
Acting Commissioner

The National Center for Education Statistics (NCES) is the primary federal entity for collecting, analyzing, and reporting data related to education in the United States and other nations. It fulfills a congressional mandate to collect, collate, analyze, and report full and complete statistics on the condition of education in the United States; conduct and publish reports and specialized analyses of the meaning and significance of such statistics; assist state and local education agencies in improving their statistical systems; and review and report on education activities in foreign countries.

NCES activities are designed to address high priority education data needs; provide consistent, reliable, complete, and accurate indicators of education status and trends; and report timely, useful, and high quality data to the U.S. Department of Education, the Congress, the states, other education policymakers, practitioners, data users, and the general public.

We strive to make our products available in a variety of formats and in language that is appropriate to a variety of audiences. You, as our customer, are the best judge of our success in communicating information effectively. If you have any comments or suggestions about this or any other NCES product or report, we would like to hear from you. Please direct your comments to:

National Center for Education Statistics
Institute of Education Sciences
U.S. Department of Education
1990 K Street NW
Washington, DC 20006–5651

June 2005

The NCES World Wide Web Home Page is http://nces.ed.gov.
The NCES World Wide Web Electronic Catalog is http://nces.ed.gov/pubsearch.

Suggested Citation

Horn, L., Cataldi, E.F., and Sikora, A. (2005). *Waiting to Attend College: Undergraduates Who Delay Their Postsecondary Enrollment* (NCES 2005–152). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

For ordering information on this report, write

U.S. Department of Education
ED Pubs
P.O. Box 1398
Jessup, MD 20794–1398

or call toll free 1–877–4ED–PUBS; or order online at http://www.edpubs.org

Content Contact

Aurora D'Amico
(202) 502–7334
Aurora.D'Amico@ed.gov

Executive Summary

Among students who enrolled in postsecondary education for the first time in 1995–96, about one-third had waited a year or more after graduating from high school to attend.[1] Students who delay their postsecondary enrollment may do so for numerous reasons. Some may not be academically prepared to attend or have the financial resources necessary to enroll. Others may serve in the military first, find employment, or start a family before enrolling. Students who delay enrollment for a long period of time are likely to enroll to advance in or change their careers. For whatever reasons students wait to enroll in college, those who do delay are at considerable risk of not completing a postsecondary credential when compared with their peers who enroll immediately after high school graduation (Carroll 1989; Tuma and Geis 1995; Berkner, Cuccaro-Alamin, and McCormick 1996; Horn 1996; Berkner, He, and Forrest Cataldi 2002). However, it may not be entirely appropriate to compare the outcomes of delayed entrants with those who attend college right after high school. This study shows that the two groups differ in many respects, especially in their academic preparation for college and their educational objectives. Furthermore, delayed entrants are not a homogeneous group. Students who delay postsecondary enrollment may range in age from 18 to 80,[2] and those who delay a short amount of time may have very different reasons for enrolling than those who delay a decade or more.

The purpose of this report is to provide a profile of students who delay their postsecondary enrollment and then to distinguish among students who delay their postsecondary enrollment with respect to how long they wait to enroll. In particular, it addresses the ways in which those who delay a shorter amount of time differ from those who delay longer in terms of their demographic characteristics, why they enroll, where they enroll, the types of programs or degrees they pursue, and their likelihood of earning a credential.

The data used for this study come from three sources. The 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000) is used to provide a snapshot of the demographic and postsecondary enrollment characteristics of all undergraduates who delay enrollment. The National Education Longitudinal Study of 1988 (NELS:88/2000) is used to examine the high school academic preparation of 1992 high school graduates who delayed postsecondary enrollment, and the 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01) is used to analyze the experiences of delayed entrants in their first postsecondary enrollment with respect to how long they waited to enroll and how likely they were to complete their postsecondary education.

The key variable in this study is an indicator of whether students delayed their postsecondary enrollment. The variable was computed by subtracting the calendar year of high school graduation from the calendar year of

[1] Beginning Postsecondary Students Longitudinal Study (BPS:96/01)
[2] 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000)

postsecondary enrollment.[3] Students who do not delay their enrollment are typically those who graduate from high school in June and enroll in postsecondary education the following September. However, because the delayed enrollment variable is derived only from the calendar years of the two points in time, a small percentage of cases (about 2 percent) are coded as having delayed 1 year when the length of delay is actually less than a year, typically a semester.

The analysis uses standard *t* tests to determine statistical significance of differences between estimates, one-way Analysis of Variance (ANOVA) to detect trends and to control for multiple paired comparisons, and a multivariate analysis to control for the common variation of related independent variables. All differences noted in the text are statistically significant at the $p < .05$ level. (See appendix B for more information about data and methods.) The analysis presented in this report is entirely descriptive in nature. While associations are noted and discussed, no causal inferences should be made.

An Overview of Delayed Entrants

Delayed entrants are by definition older than students who enroll in postsecondary education immediately after graduating from high school. Therefore, delayed entrants would be expected to have gained life experiences related to age such as family formation. Yet in addition to these experiences, the findings from the NPSAS data illustrate sharp contrasts between delayed and immediate entrants in terms of other demographic characteristics. Compared with students who enrolled in postsecondary education immediately after high school graduation, delayed entrants were more likely to come from low-income families,[4] to be single parents, to be Black and were less likely to be White (figure A). Delayed entrants also were more likely than immediate entrants to be Hispanic, American Indian, to have parents who never attended postsecondary education, and to speak a language other than English as their primary language (table 1).

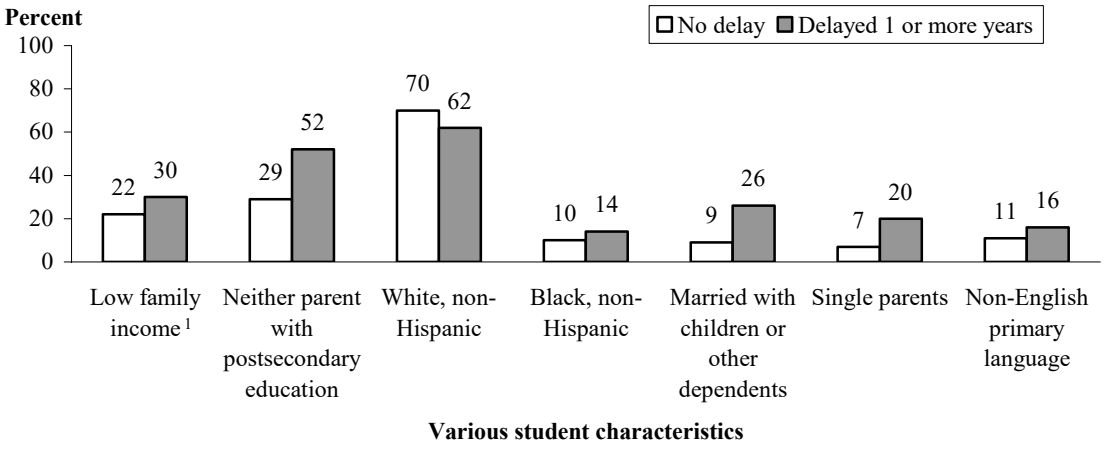
Students who delay their postsecondary enrollment are more likely than those who do not delay to follow a postsecondary enrollment path focused on vocational training and short-term programs. For example, in 1999–2000, compared with undergraduates who enrolled immediately after high school, delayed entrants were more likely to attend public 2-year colleges and private for-profit institutions (figure B). Similarly, delayed entrants were more likely than immediate entrants to be enrolled in programs leading to vocational certificates and associate's degrees and less likely to be in bachelor's degree programs (figure C). Postsecondary attendance and work patterns also differed between the two groups. Delayed entrants were less likely (or able) to attend classes on a full-time basis (figure D) and were more likely than immediate entrants to work more than 30 hours a week while enrolled in school (figure E).

Taken together, these findings from the NPSAS data, which provide a snapshot of all undergraduates in 1999–2000, indicate that delayed entrants begin their postsecondary education at a relative disadvantage compared with their peers who enroll in postsecondary education immediately after high school

[3] The actual dates of high school graduation and postsecondary enrollment, which include months and years, were missing in too many cases to provide reliable estimates; however, it was possible to impute the year if it was missing based on the students' age and other timing information.

[4] The income finding is based on family income for students who are considered dependents (typically those under age 24).

Figure A. Percentage of 1999–2000 undergraduates with various student characteristics, by timing of postsecondary enrollment

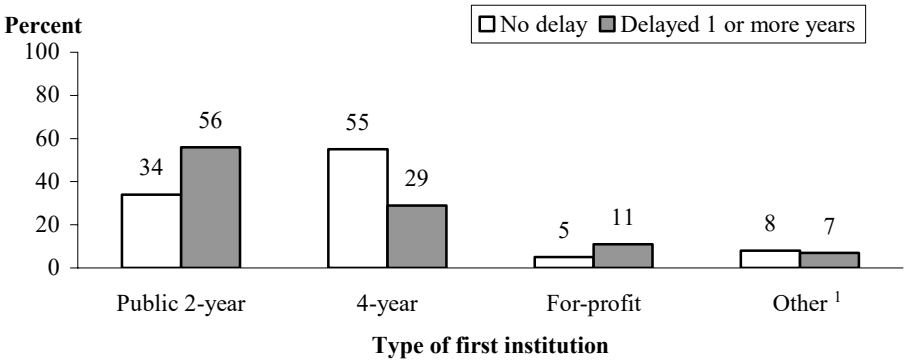


[1] Based only on dependent students' (typically age 24 or younger) family income.

NOTE: Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).

Figure B. Percentage distribution of 1999–2000 undergraduates' type of first institution, by timing of postsecondary enrollment

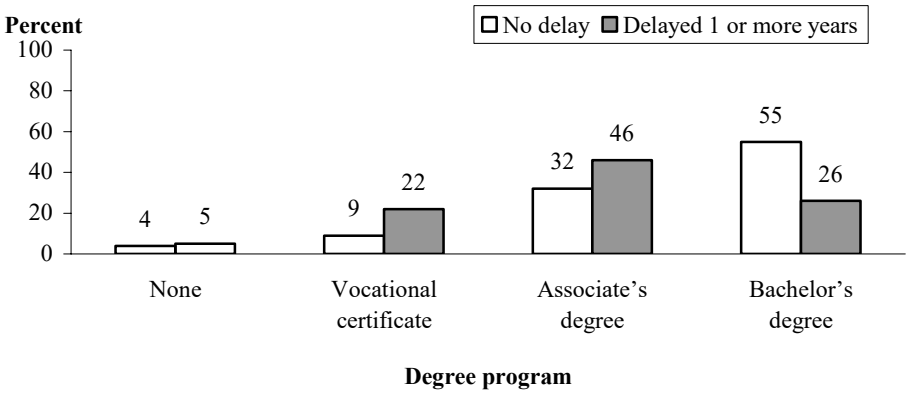


[1] All other types of institutions including public less-than-2-year and private not-for-profit less-than-4-year institutions.

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).

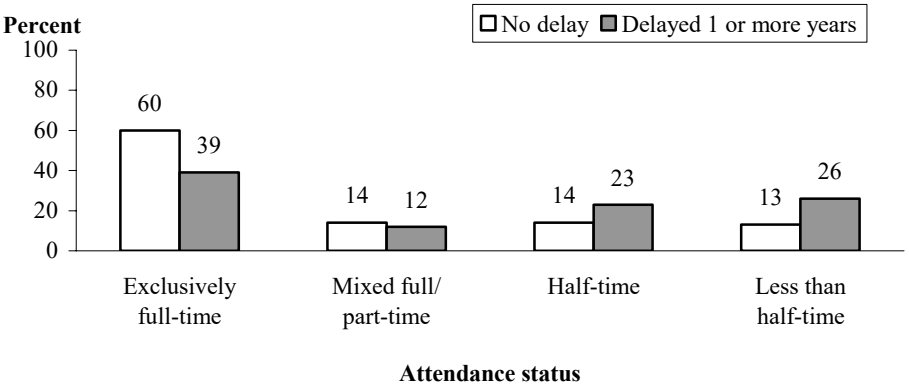
Figure C. Percentage distribution of 1999–2000 undergraduates' degree program, by timing of postsecondary enrollment



NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).

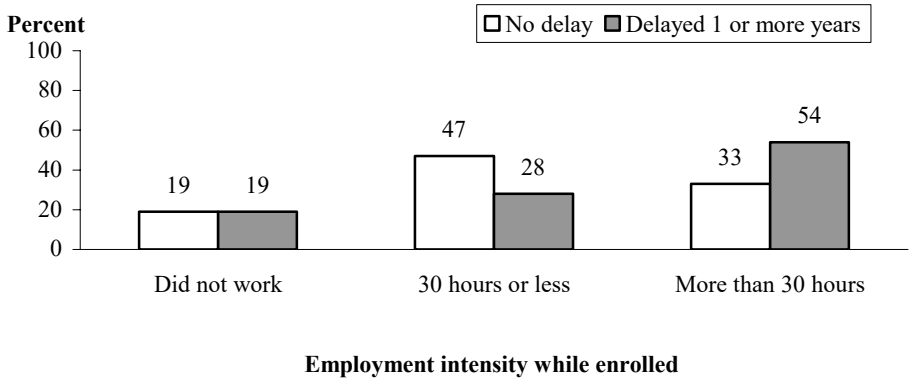
Figure D. Percentage distribution of 1999–2000 undergraduates' attendance status, by timing of postsecondary enrollment



NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).

Figure E. Percentage distribution of 1999–2000 undergraduates' employment intensity while enrolled, by timing of postsecondary enrollment



NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).

graduation. They are more likely to come from low-income families, their parents are less likely to have attended postsecondary education, and they are more likely to have family responsibilities of their own. Once they enroll in postsecondary education, delayed entrants spend less time attending classes and more time working while enrolled and are more likely to pursue vocational training and short-term credentials.

High School Dropout Risk Factors and Academic Preparation

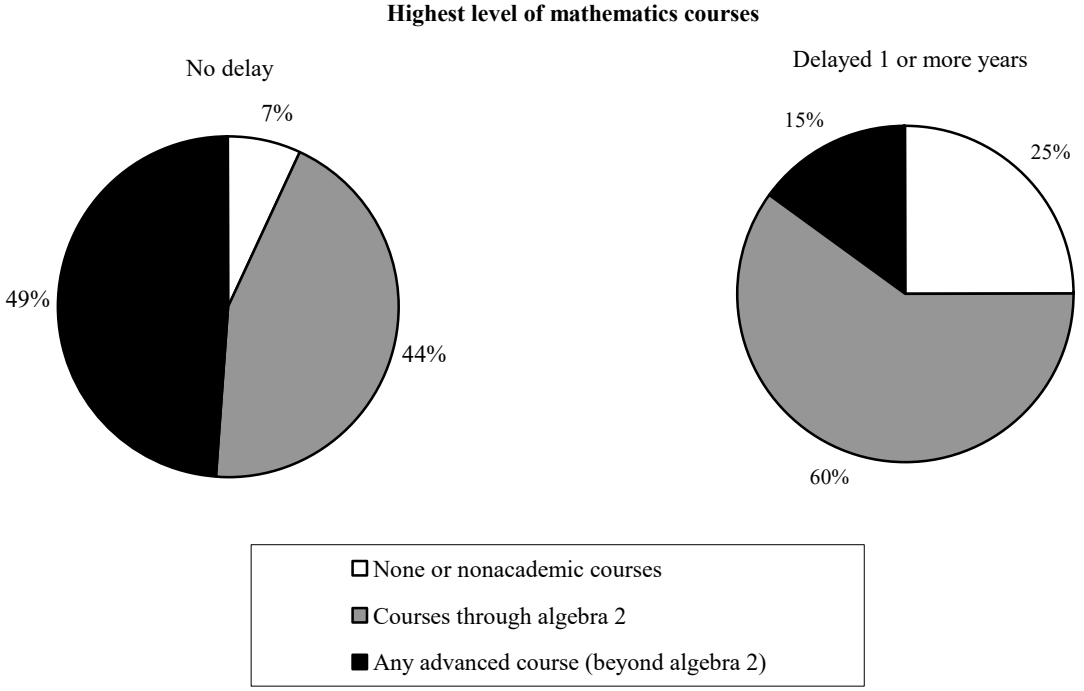
The NELS data provide evidence of notable differences between delayed and immediate entrants with respect to their high school academic experiences. The analysis examined 1992 high school graduates who enrolled in postsecondary education by 2000, the time of the last NELS follow-up, and focused on three measures of academic preparation—highest mathematics course completed,[5] the overall academic intensity of students' high school curriculum,[6] and their college readiness.[7] In all three measures delayed entrants trailed their counterparts who did not delay.

In mathematics coursetaking, one-quarter of delayed entrants completed courses no higher than those identified as nonacademic (such as remedial or business mathematics), compared with 7 percent of immediate entrants (figure F). Conversely, nearly half of immediate entrants (49 percent) completed an advanced mathematics course (i.e., beyond algebra 2), compared with 15 percent of delayed entrants.

Substantial differences between the two groups were also evident when examining the overall intensity or rigor of students' high school

[5] Developed by Burkam and Lee (2003).
[6] Developed by Adelman (1999).
[7] Developed by Berkner and Chavez (1998).

Figure F. Among 1992 high school graduates who enrolled in postsecondary education by 2000, the percentage distribution of highest level of mathematics courses completed, by timing of postsecondary enrollment



NOTE: Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000).

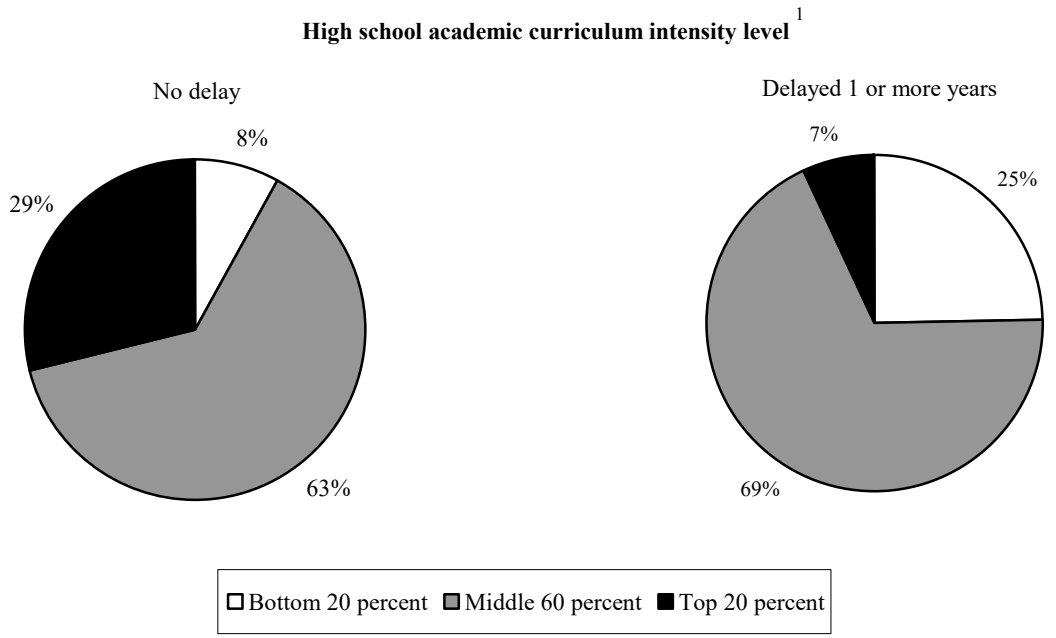
curriculum. One-quarter of delayed entrants scored in the bottom 20 percent of the academic intensity measure, compared with 8 percent of immediate entrants (figure G). Conversely, 29 percent of immediate entrants scored in the top 20 percent, compared with 7 percent of delayed entrants.

Consistent with their lower levels of academic preparation, nearly 6 in 10 delayed entrants (59 percent) were not academically prepared to undertake 4-year college-level work (figure H). The same was found for one-quarter of immediate entrants. Moreover, for those students who were qualified, 1 in 10 delayed entrants were in the top 25 percent, compared with just over 4 in 10 (44 percent) of immediate entrants.

Duration of Delay

Figure I displays the timing of enrollment and median ages for students who first enrolled in postsecondary education in 1995–96. Delayed entrants were relatively evenly distributed across the four time periods: 9 percent delayed no more than 1 year, 8 percent delayed 2–4 years, 7 percent delayed 5–9 years, and 12 percent waited 10 or

Figure G. Among 1992 high school graduates who enrolled in postsecondary education by 2000, the percentage distribution of academic curriculum intensity level, by timing of postsecondary enrollment



[1] High school academic curriculum intensity level is a composite measure of students' highest level of mathematics, total mathematics credits, total Advanced Placement courses, total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits. For more information, see Adelman, Daniel, and Berkovits (2003).

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000).

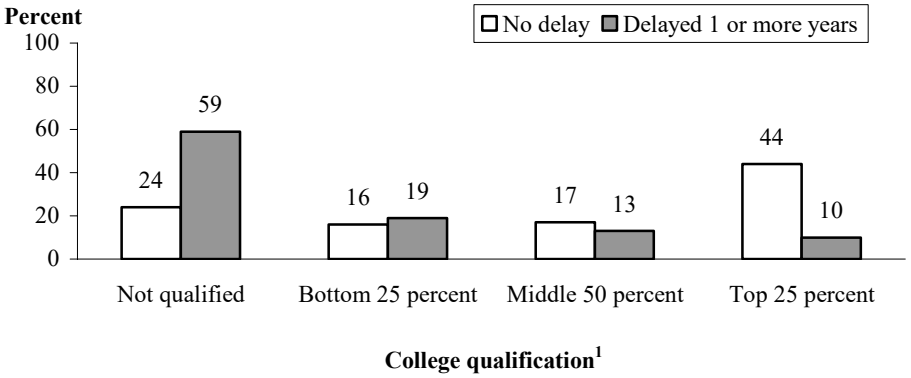
more years after high school graduation to enroll in postsecondary education.[8] How long delayed entrants waited to enroll in postsecondary education varied with demographic characteristics, enrollment status, reasons for enrolling, and the likelihood of finishing a credential.

Student Characteristics

Because of their age differences, one expects delayed entrants as a whole to differ from immediate entrants in terms of family formation and the likelihood of having children. Yet even

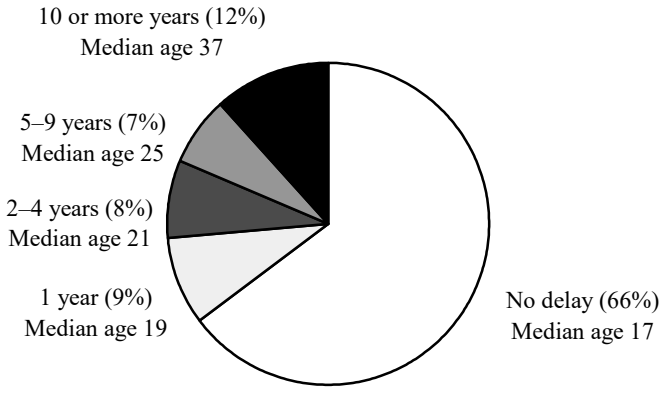
[8] For the remainder of the analysis, the results presented are based entirely on data from the BPS longitudinal study of students who first began their postsecondary studies in the 1995–96 academic year. Unlike the NPSAS sample, BPS does not include students who had enrolled in postsecondary education before their current enrollment (i.e., excludes returning students). And unlike NELS, the BPS cohort represents all beginning postsecondary students regardless of how long they waited to enroll. The postsecondary experiences captured by the BPS survey, therefore, represent the very first postsecondary enrollment after graduating from high school, regardless of how many years elapsed between high school graduation and postsecondary enrollment.

Figure H. Among 1992 high school graduates who enrolled in postsecondary education by 2000, the percentage distribution of a measure of 4-year college qualification, by timing of postsecondary enrollment



[1] College qualification is a composite index of 4-year college readiness or qualification based on five possible measures of academic performance: cumulative academic coursework GPAs, senior class rank, the NELS 1992 test scores, and the SAT and ACT college entrance examination scores.
NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000).

Figure I. Percentage distribution of 1995–96 beginning postsecondary students, by number of years between high school graduation and first postsecondary enrollment, and median age



NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

when comparing delayed entrants who are relatively young (i.e., those who delayed less than 5 years) to immediate entrants, marked differences were apparent. For example, about one-fifth of the youngest delayed entrants—those who delayed no more than 1 year (median age 19)—and nearly one-third of those who delayed 2–4 years (median age 21) had children or were responsible for other dependents, compared with 2 percent of immediate entrants.[9] These findings indicate that even relatively young delayed entrants have considerable family responsibilities.

The length of time students delayed postsecondary enrollment also varied by income level (table 5).[10] Based on their age and length of time in the labor market, one would expect those who delayed 5 or more years to have higher incomes than those who delayed a shorter period of time. This was clearly observed: 42 percent and 38 percent, respectively, of those who delayed 1 year or 2–4 years were in the lowest income group, compared with 26 percent and 17 percent, respectively, of those who delayed 5–9 years or 10 or more years. Thus, even though delayed entrants as a whole were generally more likely than those who did not delay to be in the lowest income level, as the duration of delay increased, the likelihood of being in the lowest income level declined.

In addition to income group differences, the proportion of White students increased with the duration of delay, from 62 percent of those who delayed no more than 1 year to 78 percent of those who delayed 10 or more years. So as the time between high school graduation and postsecondary enrollment went up, the likelihood of being in the lowest income level declined while the likelihood of being White increased. These patterns suggest that younger delayed entrants (i.e., those who delayed less than 5 years) tend to be at a greater socioeconomic disadvanage than those who delayed longer.

Enrollment Characteristics

When examining programs of postsecondary study among delayed entrants in relation to the length of time they waited to enroll, clear patterns emerged. For example, the likelihood of being enrolled in a bachelor's degree program declined with each successive delay group from 30 percent among those who delayed a year to 8 percent of those who delayed 10 or more years (table 6). Conversely, the longer students delayed enrollment, the more likely they were to be pursuing a program leading to a vocational certificate, from about one-quarter (23 percent) of those who delayed a year to nearly one-half (45 percent) of those who delayed 10 or more years. Delayed entrants reported relatively high educational expectations, but they also varied by length of delay. When asked to report the highest level of education they ever expected to complete, nearly 6 in 10 delayed entrants reported aspirations for a bachelor's degree (28 percent) or an advanced degree (29 percent). Aspirations for advanced degrees, however, declined with the length of time between high school graduation and postsecondary enrollment—from 42 percent of those who delayed 1 year to 13 percent of those who delayed a decade or more—while aspirations for credentials below a bachelor's degree increased proportionately from 13 percent to 48 percent as delay increased. The results indicate that as delayed entrants age, they tend to look to

[9] See bottom of table 4 ("Independent with dependents") for proportion of students with children or dependents.

[10] In this analysis, the income distribution is based on family income for dependent students (i.e., those students who are considered financially dependent on their parents for financial aid purposes) and student income for those who are independent. As discussed above, about three-quarters of those who delayed enrollment by 1 year were dependent, as were about one-half of those who delayed 2–4 years, while students who delayed 5 or more years were nearly all independent.

postsecondary education for vocational training, while those who delay shorter periods of time continue to report aspirations for bachelor's or even advanced degrees.

Why They Enrolled

When asked why they decided to enroll in postsecondary education, students who delayed enrollment reported various reasons as important, most of which were related to job training and career advancement. Reasons varied with how long delayed entrants waited to enroll. For example, reporting the need for training to enter the workforce declined as the duration of time between high school graduation and postsecondary enrollment increased (table 8). Conversely, students who reported enrolling in postsecondary education to change careers or improve job skills were more likely to do so as the duration of time between high school graduation and postsecondary enrollment increased.

Overall Persistence and Attainment

As was found in earlier research, the results from this study confirmed that students who delay their postsecondary enrollment earn postsecondary credentials at lower rates than their peers who enroll immediately after high school. Among 1995–96 beginning postsecondary students, 40 percent of delayed entrants had earned some kind of postsecondary credential within 6 years, compared with 58 percent of immediate entrants (table 9). In contrast, 47 percent of delayed entrants were not enrolled in 2001 and had not earned a credential, compared with 27 percent of immediate entrants. However, this study was more concerned with the association between length of delay and educational outcomes among delayed entrants. For example, as the length of delay between high school graduation and college enrollment increased, the likelihood of attaining a bachelor's degree within 6 years declined. However, degree goals differed among groups who delayed shorter and longer periods of time. Therefore, it was necessary to conduct a multivariate analysis in order to control for differing degree goals and other factors related to the duration of delay.

When taking into account length of delay as well as the common variation of variables related to both delayed enrollment and degree completion (including gender, race/ethnicity, institution attended, attendance status, degree program, educational expectations, and remedial coursetaking), the likelihood of delayed entrants completing a postsecondary credential or still being enrolled was significantly lower than immediate entrants only for those who delayed no more than 1 year, while the results for students who delayed longer periods of time were not statistically significant (table 11).

Conclusions

The results of this study demonstrate that students who delay their postsecondary enrollment a year or more after high school graduation differ fundamentally from those who enroll immediately. Early on, delayed entrants are more likely to have family and educational experiences that place them at greater risk of not completing their postsecondary education. When delayed entrants enroll in postsecondary education, they do so primarily to gain or enhance their work skills and tend to enroll in shorter term vocational programs rather than in bachelor's degree programs.

Yet delayed entrants are not a homogenous group. Who they are and what kinds of postsecondary programs they pursue varied with how long they waited to enroll. In general, the findings from this study indicated that as the length of delay increased, students were more likely to be White, less likely to be in the lowest income group, and more likely to enroll in programs leading to vocational certificates.

While delayed entrants as a whole were much less likely than immediate entrants to complete a postsecondary degree or to remain enrolled for 6 years, results of the multivariate analysis indicate that students who delayed the shortest amount of time—no more than 1 year after high school graduation—remained significantly less likely than immediate entrants to complete a degree, while the results for those who delayed longer were not significant. Students who delay no more than a year are typically 19 years old when they enroll in college and about 1 in 5 already have children. Nevertheless, despite their relative disadvantages, 43 percent of students who delayed their enrollment no more than 1 year had successfully completed a postsecondary credential, including one-fifth who earned a bachelor's degree in 6 years.

Foreword

This report describes the characteristics and outcomes of students who delay enrollment in postsecondary education. It covers the ways in which the demographic, enrollment, and attendance patterns of students who delay postsecondary enrollment differ from their peers who enroll immediately after high school graduation. In addition, the report discusses how students who delay a shorter amount of time differ from those who delay longer.

This report is based on data from the 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000), the National Education Longitudinal Study of 1988 (NELS:88/2000), and the 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01). NPSAS:2000 is the fifth in a series of surveys conducted by the U.S. Department of Education. Each NPSAS is a comprehensive nationwide study to determine how students and their families pay for postsecondary education.

NELS:88/2000 is a longitudinal study of a cohort of students who were in the 8th grade in 1988. These students were followed up in 1990, 1992 (when most had finished high school), 1994, and 2000 (about 8 years after most had graduated from high school). The NELS data are used to compare the academic preparation of students who enroll in college immediately after high school graduation with those who delay their enrollment.

The BPS survey is a longitudinal component of the 1996 NPSAS, a nationally representative sample that includes students enrolled in all types of postsecondary institutions. The BPS:96/01 cohort consists of students in the NPSAS:96 sample who were identified as having enrolled in postsecondary education for the first time during the 1995–96 academic year.

The estimates presented in the report were produced using the NCES Data Analysis System (DAS), a web-based software application that allows users to specify and generate tables for the NPSAS:2000, NELS:88/2000, and BPS:96/01 surveys. The DAS produces the design-adjusted standard errors necessary for testing the statistical significance of differences in the estimates. The DAS for NPSAS:2000, BPS:96/01, and other NCES surveys, as well as many descriptive methodology reports, can be accessed from the NCES website (http://nces.ed.gov/DAS). For more information on the DAS, consult appendix B of this report.

Acknowledgments

The authors appreciate the contributions of staff members at MPR Associates, NCES and other U.S. Department of Education offices, and nongovernmental agencies to the production of this report. At MPR Associates, Francesca Tussing supplied expert assistance in the production of the report. Andrea Livingston and Ellen Bradburn provided helpful editorial and substantive reviews. Annabelle Yang formatted the final report, and Barbara Kridl proofed the report and oversaw final production.

Outside of MPR Associates, C. Dennis Carroll at NCES oversaw the production and development of the report through all stages, providing feedback on all drafts. Paula Knepper was the senior technical advisor for the report. Shelley Burns and Marilyn Seastrom provided the technical and methodological review. Clifford Adelman (Office of Vocational and Adult Education) reviewed the preliminary results.

We would also like to thank Daniel Goldenberg (Office of the Deputy Secretary), Larry Suter (National Science Foundation), and Dongbin Kim (National Association of Independent Colleges and Universities) for reviewing the draft report and providing helpful comments.

Duc-Le To of the Institute of Education Sciences (IES) coordinated the final review by two outside reviewers. The authors thank all of these reviewers for their contributions.

THIS PAGE INTENTIONALLY LEFT BLANK

Table of Contents

List of Tables

Table **Page**

Appendix

List of Figures

Introduction

Many people do not enter postsecondary education immediately after high school graduation. Among all undergraduates enrolled in 1999–2000, for example, just over one-third (37 percent) waited at least 1 year to enroll.[1] Previous research based on earlier data has shown that students who delay their postsecondary enrollment are very different from those who enroll immediately after high school (Horn and Premo 1996; Horn 1996). In addition to being older, delayed entrants enroll in college with fewer resources than other students (e.g., they are more likely to be from low-income families), and they are more likely to be Black and less likely to be White. Delayed entrants also are more likely to have family responsibilities and to be single parents. These earlier studies have also shown that when delayed entrants enroll in postsecondary education, they are more likely than their peers who do not delay to attend public 2-year colleges and less likely to attend 4-year institutions. All of these characteristics are related to lower rates of postsecondary degree completion (Berkner, Cuccaro-Alamin, and McCormick 1996; Horn 1996; Berkner, He, and Cataldi 2002). As a result, students who delay enrollment are at greater risk of not completing their postsecondary education than their counterparts who enroll immediately after high school graduation (Carroll 1989; Tuma and Geis 1995; Berkner, Cuccaro-Alamin, and McCormick 1996; Horn 1996; Berkner, He, and Cataldi 2002).

While these studies have demonstrated the relative disadvantage of students who delay enrollment in general, they were based on earlier data and delayed enrollment was not the focus of the analysis. Students may delay enrollment for many different reasons. Some may not be academically or financially prepared to attend, others may serve in the military or try working first, and still others may not be interested in attending. Those who enroll in postsecondary education many years after high school graduation may be changing careers or seeking additional training to advance in their occupations.

By definition, delayed entrants are older than students who enroll right after high school. However, students who delay postsecondary enrollment may range in age from 18 to 80,[2] and those who delay a short amount of time may have very different reasons for enrolling than those who delay a decade or more. The purpose of this report is to distinguish among students who delay their postsecondary enrollment with respect to how long they wait to enroll. In particular,

[1] 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000)
[2] 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).

this report seeks to examine the ways in which those who delay a shorter amount of time differ from those who delay longer in terms of why they enroll, where they enroll, the types of programs or degrees they pursue, and their likelihood of earning a credential.

Specifically, the study addresses the following questions:

- Who delays postsecondary enrollment, and how do they differ from those who do not delay with respect to their demographic characteristics, high school academic preparation, and postsecondary enrollment characteristics?
- How do students who delay a shorter amount of time (e.g., 4 years or less) differ from those who delay longer with respect to why they enrolled, where they enrolled, and their educational experiences?
- How is the length of delay between high school graduation and postsecondary enrollment related to the likelihood of completing a postsecondary credential?

Data and Methods

The data used for the study come from three sources. The 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000) is used to profile all delayed entrants who were enrolled in the 1999–2000 academic year. The National Education Longitudinal Study of 1988 (NELS:88/2000) is used to analyze the high school academic preparation of students who delay postsecondary enrollment, and the 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01) is used to examine the characteristics of delayed entrants and their likelihood of completing their postsecondary education in relation to how long they waited to enroll.

NPSAS:2000 surveyed a nationally representative sample of all students enrolled in postsecondary education in the 1999–2000 academic year. The NPSAS survey, which is conducted every 3 to 4 years, targets the population of all students enrolled in Title IV institutions[3] in the United States or Puerto Rico between July 1 and June 30 in the given academic year of the survey; in the case of NPSAS:2000, it is the 1999–2000 academic year. The institutional sampling frame is based on the previous year's Integrated Postsecondary Education Data System, Institutional Characteristics Survey (IPEDS-IC). A student list is provided by each sampled institution. In NPSAS:2000, about 62,000 study respondents were sampled, of whom about 50,000 were undergraduates. Of these students, a subsample of 44,500 students completed a computer-assisted telephone interview (CATI). In addition to the CATI, NPSAS collects data from many supplementary sources including the institution, the Pell grant file, the National Student Loan Data System, and financial aid application files. The institutional response rate was

[3] Title IV postsecondary institutions have an agreement with the Office of Postsecondary Education to participate in federal student assistance programs.

91 percent, and the overall weighted response rate for all students was 66 percent (see appendix B for more detail about bias analysis and adjustment for bias). The analysis sample in this report includes only undergraduates.

NELS:88/2000 began with a nationally representative sample of 1988 8th-graders and surveyed them every 2 years until 1994 and then again in 2000.[4] In spring 1992, when most of the students in the NELS:88 sample were 12th-graders, the second follow-up took place. This survey focused on students' transition from high school to both the labor force and postsecondary education. By the final 2000 follow-up, when most of the participants were 26 years old, it included over 12,000 completed cases, with a weighted response rate of 82.7 percent. The sample in this report includes 1992 high school seniors for whom high school transcripts were collected and who had enrolled in postsecondary education as of the last follow-up in 2000.[5] The analysis sample was further restricted to 1992 12th-graders who had completed high school by August 31, 1992 (96 percent of 12th-graders for whom high school transcripts had been collected).

BPS:96/01 is a longitudinal component of the NPSAS:96 survey. The survey consists of students who were enrolled in postsecondary education for the first time in 1995–96 among those who had participated in NPSAS:96.[6] The BPS survey began with a nationally representative sample of approximately 12,000 students who were identified in NPSAS:96 as having entered postsecondary education for the first time in 1995–96. The first follow-up took place 2 years later in 1998, and the second follow-up was conducted in 2001, 6 years after the students had enrolled in postsecondary education. All respondents to the first follow-up, as well as a subsample of nonrespondents in 1998, were eligible to be interviewed. About 9,000 students were located and interviewed, with a weighted response rate of 83.6 percent overall.

The key variable in this study is an indicator of whether students delayed their postsecondary enrollment. The variable was computed by subtracting the calendar year of high school graduation from the calendar year of postsecondary enrollment.[7] Thus, by definition, high school dropouts are excluded. Students who do not delay their enrollment are typically those who graduate from high school in June and enroll in postsecondary education the following

[4] For more information on NELS:88/2000, consult U.S. Department of Education, National Center for Education Statistics, *National Education Longitudinal Study of 1988: Base-Year to Fourth Follow-up Data File User's Manual* (NCES 2002–323) (Washington, DC: 2002).
[5] The weight used allows for unbiased projections to 12th-graders in the spring of 1992 for whom high school transcripts had been collected.
[6] For more information on BPS:96/01, consult U.S. Department of Education, National Center for Education Statistics, *Beginning Postsecondary Students Longitudinal Study:1996–2001 Methodology Report* (NCES 2002–171) (Washington, DC: 2002).
[7] The actual dates of high school graduation and postsecondary enrollment, which include months and years, were missing in too many cases in NPSAS to provide reliable estimates; however, it was possible to impute the year if it was missing based on the students' age and other timing information (for more information, see the glossary in appendix A for the NPSAS variable "DELAYENR").

September. However, because the delayed enrollment variable is derived only from the calendar years of the two points in time, a small percentage of cases (about 2 percent) are coded as having delayed 1 year when the length of delay is actually less than a year, typically a semester. For example, in the NPSAS sample, if a student graduated from high school in June 1999 and enrolled in college in January 2000, that student was identified as delaying for a year when in fact they only delayed 6–7 months.

Only BPS data were used to analyze differences among delayed entrants with respect to how long they delayed. This survey includes all students who enrolled in postsecondary education for the first time in 1995–96. Therefore, it captures the first enrollment of all delayed entrants, regardless of how long they waited to enroll. While all delayed entrants can be identified in the NPSAS data, many of them have enrolled in postsecondary education more than once. Delayed enrollment is based on students' first postsecondary enrollment. Thus, there are some NPSAS students identified as short-term delayed entrants who may have enrolled two or three times and resemble long-term delayed entrants in age and experience. Because it is not possible to disentangle the effects of delayed enrollment from multiple enrollments, the NPSAS data were used only to provide a general profile of all delayed entrants (i.e., a snapshot of delayed entrants among all undergraduates enrolled in 1999–2000).

For different reasons, the NELS data, which were used to examine the high school academic preparation of delayed entrants, could not be disaggregated by duration of the delay. The NELS survey represents a high school cohort (i.e., participants are roughly the same age), and most of those who enrolled in postsecondary education usually did so immediately after high school graduation (80 percent).[8] In addition to the relatively small sample of delayed entrants, the last follow-up of NELS took place 8 years after most of the cohort had graduated from high school, so it was not possible to identify long-term delayed entrants.

The length of delay categories analyzed in the study—no more than 1 year, 2–4 years, 5–9 years, and 10 or more years—was empirically determined based on the distribution of students, by the number of years delayed. The categories also were designed to distinguish short-term (less than 5 years) from long-term (5 years or more) delayed entrants. The short-term delayed entrants were divided into those who delayed no more than 1 year and those who delayed 2–4 years. The long-term delayed entrants were divided into those who delayed 5–9 years and those who delayed 10 or more years.

[8] NELS:88/2000 Data Analysis System. As a point of comparison, the proportion of immediate entrants among all 1999–2000 undergraduates was 63 percent and among all first-time freshman who enrolled in 1995–96 (BPS:96/2001) was 64 percent (see figures A and K).

The analysis uses standard *t* tests to determine the statistical significance of differences between estimates, one-way Analysis of Variance (ANOVA) to detect trends and control for multiple comparisons, and a multivariate commonality analysis to examine relationships between variables while controlling for the common variance of independent variables. All differences noted are statistically significant at the $p < .05$ level. For more information on statistical methods, see appendix B. The analysis presented in this report is entirely descriptive in nature. While associations are noted and discussed, no causal inferences should be made.

Organization of the Report

The remainder of this report is divided into four sections beginning with an overview comparing delayed entrants with their peers who enroll in postsecondary education immediately after high school graduation. Comparisons are made between the two groups with respect to their demographic characteristics, high school academic preparation, and postsecondary enrollment patterns. The second section focuses on delayed entrants and examines differences within this group based on how long they delayed. The third section examines the activities of delayed entrants in the intervening years between high school and college, and the reasons they gave for enrolling in postsecondary education. The fourth section analyzes the rates of persistence and degree completion of delayed entrants, and the fifth and final section summarizes and concludes the report.

THIS PAGE INTENTIONALLY LEFT BLANK

Delayed Entrants: An Overview

Because delayed entrants by definition are older than students who enroll in postsecondary education immediately after graduating from high school, delayed entrants would be expected to have gained life experiences related to age such as family formation and employment experience. While these patterns have been observed (Horn and Premo 1996), delayed entrants also differed in other respects from their peers who enrolled in postsecondary education right after high school graduation.

Demographic Characteristics

Earlier research demonstrated that compared to students who enrolled immediately after high school, delayed entrants were more likely to come from low-income families, to be single parents, and to be Black, and were less likely to be White (Horn and Premo 1996). The current analysis, based on results from the NPSAS:2000 data confirmed these differences (table 1). Additional analyses revealed that delayed entrants were more likely than immediate entrants to be Hispanic, American Indian, to have parents who never attended postsecondary education, and to speak a language other than English as their primary language.

High School Dropout Risk Factors and Academic Preparation

Using the NELS data, 1992 high school graduates who enrolled in postsecondary education were examined in several respects. First, delayed entrants were compared with those who did not delay in terms of their likelihood of having characteristics in the 8th grade that may have placed them at risk of dropping out of high school. The high school dropout risk variable is based on indicators of socioeconomic status (SES), family stability, and academic performance in 1988. If students had one or more of the following six characteristics, they were identified as being at risk of dropping out: being in the lowest 25 percent on a socioeconomic status indicator, living with a single parent, changing schools two or more times between 1st and 8th grade, repeating a grade between kindergarten and 8th grade, earning grades of C's or lower in middle school (6th–8th grade), and having a sibling who dropped out of high school (Kaufman, Bradby, and Owings 1992). As illustrated in table 2, students who delayed their postsecondary enrollment were more likely than their peers who did not delay to have been at risk of dropping out of high school. In fact, nearly three-quarters (74 percent) had at least one dropout risk factor, compared with about

Table 1. Percentage distributions of selected student characteristics among all undergraduates, by timing of their postsecondary enrollment: 1999–2000

Selected student characteristics	U.S. total (excluding Puerto Rico)	Total (50 states, DC, and Puerto Rico)	Timing of postsecondary enrollment after high school graduation	
			No delay	Delayed 1 or more years
Total	100.0	100.0	100.0	100.0
Gender				
Male	43.6	43.6	43.4	44.0
Female	56.4	56.4	56.6	56.0
Race/ethnicity[1]				
American Indian	0.8	0.8	0.7	1.0
Asian	4.8	4.7	4.6	5.0
Black	12.0	11.8	10.3	14.4
Hispanic	10.3	11.5	10.2	13.1
Asian/Pacific Islander	0.8	0.8	0.7	0.8
White	67.9	66.8	70.0	62.0
More than one race	1.9	2.0	1.9	2.1
Other[2]	1.6	1.6	1.6	1.6
Dependency and marital status				
Dependent	50.5	50.7	66.5	23.6
Independent	49.5	49.3	33.5	76.4
Unmarried, no dependents	15.2	15.1	12.0	20.3
Unmarried, dependents (single parent)	11.7	11.8	6.9	19.9
Married, no dependents	6.9	6.9	5.1	9.9
Married, dependents	15.7	15.6	9.4	26.3
Income level				
Dependent				
Bottom 25 percent	22.7	23.5	22.0	30.4
Middle 50 percent	50.3	49.9	50.3	47.6
Top 25 percent	27.0	26.6	27.7	22.0
Independent				
Bottom 25 percent	22.2	22.7	24.0	21.3
Middle 50 percent	51.1	50.9	49.7	52.0
Top 25 percent	26.7	26.4	26.3	26.8
Parents' education				
High school diploma or less	36.7	37.1	28.9	52.0
Some postsecondary education	23.0	22.8	24.2	20.4
Bachelor's degree	22.9	22.8	26.0	17.1
Advanced degree	17.4	17.3	20.9	10.5
Primary language				
English	87.7	87.3	89.3	83.6
Not English	12.3	12.7	10.7	16.4

[1] American Indian includes Alaska Native, Black includes African American, Asian/Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin unless specified.

[2] Students were given the opportunity to list a specific racial/ethnic identification under "Other."

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).

Table 2. Among 1992 high school graduates who enrolled in postsecondary education by 2000, percentage distributions of high school dropout risk status and academic preparation measures, by timing of their postsecondary enrollment: 1999–2000

High school dropout risk status or academic preparation measures	No delay	Delayed 1 or more years
Total	100.0	100.0
Socioeconomic status level		
Bottom 25 percent	10.5	27.4
Middle 50 percent	50.3	55.5
Top 25 percent	39.2	17.1
High school dropout risk status[1]		
No risk	50.7	26.5
Any risk factors	49.3	73.5
High school mathematics courses completed		
None or nonacademic	7.3	24.6
Courses through algebra 2	44.0	60.4
Any advanced course beyond algebra 2	48.7	15.0
Academic curriculum intensity level[2]		
Bottom 20 percent	7.8	24.9
Middle 60 percent	63.3	73.5
Top 20 percent	29.0	6.5
4-year college qualification level[3]		
Not qualified	24.2	58.5
Qualified		
Bottom 25 percent	15.6	19.0
Middle 50 percent	16.7	12.9
Top 25 percent	43.5	9.6

[1] Risk factors were determined when students were in 8th grade and included family income in lowest 25 percent among 8th-grade cohort, live with a single parent, older sibling dropped out of high school, changed schools two or more times, average grades of C or lower from 6th to 8th grade, and repeated a grade between kindergarten and 8th grade.

[2] High school academic curriculum intensity level is a composite measure of students' highest level of mathematics, total mathematics credits, total Advanced Placement courses, total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits. For more information, see Adelman, Daniel, and Berkovits (2003).

[3] College qualification is a composite index of 4-year college readiness or qualification based on five possible measures of academic performance: cumulative academic coursework GPAs, senior class rank, the NELS 1992 test scores, and the SAT and ACT college entrance examination scores.

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, National Education Longitudinal Study of 1988 (NELS:88/2000).

one-half (49 percent) of those who did not delay. Consistent with their risk levels for dropping out of high school as determined in the 8th grade, delayed entrants also were more likely to be in the lowest SES group in 1992 when most were in the 12th grade (27 versus 11 percent). Yet the fact that delayed entrants completed high school and subsequently enrolled in postsecondary education indicates that they could overcome the odds of dropping out.

Along with their increased risk of dropping out of high school, delayed entrants trailed their counterparts who did not delay in three measures of academic preparation—highest mathematics course completed,[9] the overall academic intensity of students' high school curriculum,[10] and their college readiness.[11]

Looking first at students' mathematics coursetaking revealed that one-quarter of delayed entrants completed courses no higher than those identified as nonacademic (such as remedial or business mathematics), compared with 7 percent of immediate entrants (table 2). Conversely, nearly half of immediate entrants (49 percent) completed an advanced mathematics course (i.e., beyond algebra 2), compared with 15 percent of delayed entrants.

Students' intensity of overall academic curriculum is based on the highest level mathematics course taken and total mathematics credits completed, as well as the total credits completed in Advanced Placement, English, foreign language, science, and computer science courses. Based on the academic intensity indicator, delayed entrants differed notably from their peers who did not delay. For delayed entrants, 7 percent completed a curriculum at the highest academic intensity level, compared with 29 percent of those who had not delayed**.** Conversely, 25 percent of delayed entrants completed a curriculum at the lowest intensity level, compared with 8 percent of those who had not delayed.

The final measure of academic preparation examined is an indicator of students' readiness or level of qualification for attending a 4-year college. The variable is also based on a number of academic performance measures including cumulative academic coursework, high school grade point average (GPA), senior class rank, the NELS 1992 test scores, and the SAT and ACT college entrance examination scores (see appendix A for more details). Nearly 6 in 10 (59 percent) of delayed entrants were not prepared to enroll in a 4-year college, compared with one-quarter of their peers who did not delay. Conversely, 1 in 10 delayed entrants scored at the highest college qualification level, compared with just over 4 in 10 (44 percent) of those who did not delay.

[9] Developed by Burkam and Lee (2003).
[10] Developed by Adelman (1999).
[11] Developed by Berkner and Chavez 1998).

The results based on the NELS high school cohort, indicate that delayed entrants were more likely than their peers who enrolled in college immediately after high school to have risk factors associated with dropping out of high school and to struggle academically. Based on the mathematics courses they completed and their overall academic coursetaking patterns, delayed entrants were much less likely to have the academic preparation to undertake college-level work.

Postsecondary Enrollment Patterns

Given the NELS findings regarding delayed entrants' academic preparation findings, it is not surprising to find that delayed entrants pursue vocational training and enroll in public 2-year colleges at higher rates and in 4-year institutions at lower rates than students who enroll in college immediately after high school graduation. For example, in 1999–2000, delayed entrants were more likely than their peers who enrolled immediately after high school to attend public 2-year colleges and private for-profit institutions, and less likely to attend 4-year colleges (table 3). Corresponding to the institution in which they first enrolled, delayed entrants also were more likely to be enrolled in programs leading to vocational certificates and associate's degrees than in bachelor's degree programs.

Delayed entrants also differed from immediate entrants with respect to their postsecondary attendance and work patterns. Compared with their peers who did not delay postsecondary enrollment, delayed entrants were less likely (or able) to attend classes on a full-time basis and were more likely to work more than 30 hours a week while enrolled in school.

Taken together, the results from the NPSAS data indicate that, compared with their peers who enroll in postsecondary education immediately after high school, delayed entrants begin their postsecondary education at a relative disadvantage with respect to their family background, parents' education levels, and tendency to have their own family responsibilities. Also, delayed entrants spend less time attending classes and more time working while enrolled, and they are more likely to pursue vocational training and short-term credentials.

Table 3. Percentage distributions of enrollment and employment characteristics of all undergraduates, by timing of their postsecondary enrollment: 1999–2000

Enrollment or employment characteristics	U.S. total (excluding Puerto Rico)	Total (50 states, DC, and Puerto Rico)	Timing of postsecondary enrollment after high school graduation	
			No delay	Delayed 1 or more years
Total	100.0	100.0	100.0	100.0
Type of institution				
Public 2-year	42.7	42.1	33.5	56.2
4-year institutions	44.7	45.4	55.1	29.3
Public 4-year	31.4	31.3	38.6	19.7
Private not-for-profit	13.3	14.0	16.5	9.7
Private for-profit	4.8	4.9	3.3	7.6
Other[1]	7.7	7.7	8.1	6.9
Degree program				
No undergraduate degree	4.4	4.4	3.6	5.3
Certificate	14.1	14.1	9.0	22.1
Associate's degree	37.8	37.5	32.4	46.3
Bachelor's degree or higher	43.7	44.1	54.9	26.4
Attendance intensity				
Exclusively full-time	51.8	52.3	60.1	39.2
Half-time	17.2	17.1	13.6	22.9
Less than half-time	18.0	17.8	12.9	26.0
Mixed	13.0	12.8	13.5	11.9
Hours worked while enrolled				
Did not work	19.0	19.4	19.3	18.8
30 or less	40.0	40.0	47.3	27.7
More than 30	41.0	40.7	33.4	53.6

[1] "Other" institutions include public less-than-2-year, private not-for-profit 2-year, and private not-for-profit less-than-2-year institutions.

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000).

Duration of Delay

While delayed entrants differ in many respects from their peers who enroll in postsecondary education immediately after high school graduation, the question addressed in this section is whether delayed entrants differ from one another based on how long they delay.

For the remainder of the study, the results presented are based on data from the Beginning Postsecondary Students Longitudinal Study (BPS:96/01), a cohort of students who first began their postsecondary studies in the 1995–96 academic year. Unlike the NPSAS sample, BPS does not include students who enrolled in postsecondary education before their current enrollment (i.e., excludes returning students). And unlike the NELS sample, the BPS cohort represents all beginning postsecondary students regardless of how long they waited to enroll. The postsecondary experiences captured by the BPS survey, therefore, represent those of students who enrolled in postsecondary education for the first time after graduating from high school, regardless of how many years elapsed between high school graduation and postsecondary enrollment.

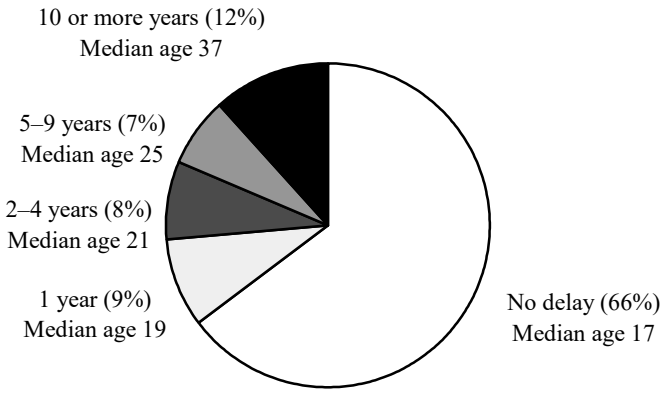
Among BPS students, roughly one-third had delayed their postsecondary enrollment, including 9 percent who delayed no more than 1 year, 8 percent who delayed 2–4 years, 7 percent who delayed 5–9 years, and 12 percent who delayed 10 or more years after high school graduation (figure 1).

Student Characteristics

By definition, delayed entrants are older than their peers who enroll in postsecondary education right after high school graduation. However, it is worth noting that the median age of students who did not delay enrollment is 17 years old, compared with 19 years old for those who delayed no more than 1 year (figure 1). This difference suggests that students who delay a year may be somewhat older at high school graduation than those who do not delay.

The age at which students are considered financially independent of their parents for financial aid purposes is 24 years old. However, students under 24 years old may be identified as independent for reasons other than age—primarily if they are married or have children of their own. Among students who delayed their postsecondary enrollment less than 5 years, nearly all were under the age of 24. Yet roughly one-quarter of those who delayed no more than 1 year and

Figure 1. Percentage distribution of 1995–96 beginning postsecondary students, by number of years between high school graduation and first postsecondary enrollment, and median age



NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

about one-half of those who delayed 2–4 years were identified as independent (table 4). Many of these students had children: about one-fifth (21 percent) of those who delayed 1 year and one-third (32 percent) of those who delayed 2–4 years. In contrast, among students who did not delay their enrollment, 2 percent had children or other dependents. Thus, parenthood is a major factor that distinguishes younger delayed entrants (i.e., delayed less than 5 years) from their peers who do not delay.

As was shown in figure 1, the median ages for students who delayed 5–9 years or 10 or more years were 25 and 37 years old, respectively. Given their ages, one would expect many of these students to have family responsibilities. Indeed, for those who delayed 5–9 years, 55 percent were parents, as were 63 percent of those who delayed 10 or more years (table 4).

Among BPS students, the gender distribution appeared to vary with the duration of enrollment delay (table 5).[12] With the exception of those who delayed 2–4 years, the percentage of women appeared to increase with each successive group of delayed entrants; however, the apparent trend is not statistically significant.

[12] For additional information, a table is presented in appendix C (table C-1) showing the percentage of students who delayed their enrollment, by the characteristics and educational experiences presented in tables 5 and 6.

Table 4. Percentage distribution of 1995–96 beginning postsecondary students' dependency and marital status, by number of years between high school graduation and first postsecondary enrollment

Dependency and marital status	U.S. total (excluding Puerto Rico)	Total (50 states, DC, and Puerto Rico)	No delay	Duration of delay				
				Any delay	1 year	2–4 years	5–9 years	10 or more years
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Dependency and marital status in 1995–96								
Dependent	72.1	72.5	96.4	31.0	73.2	50.9	4.6	#
Independent, no dependents, unmarried	5.6	5.5	0.7	15.1	2.4	13.2	31.3	17.1
Independent, no dependents, married	4.0	4.0	0.5	10.2	3.8	4.3	9.1	19.6
Independent with dependents	18.2	18.0	2.4	43.8	20.6	31.5	55.0	63.4

Rounds to zero.

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

Examining delayed entrants with respect to their income at the time they first enrolled in postsecondary education revealed an inverse relationship of income to the duration of delay in enrolling in postsecondary education. In this analysis, the income distribution is based on family income for dependent students (i.e., those students who are considered financially dependent on their parents for financial aid purposes) and student income for those who are independent. As was shown in table 4, about three-quarters (73 percent) of those who delayed enrollment by 1 year were dependent, as were about one-half of those who delayed 2–4 years, while students who delayed 5 or more years were nearly all independent. Based on their age and length of time in the labor market, one would expect that those who delayed 5 or more years would have higher incomes than those who delayed a shorter period. This was clearly observed in table 5: the likelihood of being in the lowest income group declined between those who delayed less than 5 years and those who delayed longer; 42 percent and 38 percent, respectively, of those who delayed 1 year or 2–4 years were in the lowest income group, compared with 26 percent and 17 percent, respectively, of those who delayed 5–9 years or 10 or more years.[13] Thus, the likelihood of being in the lowest income group declined as the duration of delay increased, and income level distinguished entrants who delayed for the short term (less than 5 years) from those who delayed for the long term (5 or more years).

[13] To simplify the statistical test reporting, when ANOVA trend results are presented, unless otherwise noted, the overall F is also significant.

Table 5. Percentage distributions of selected student characteristics among 1995–96 beginning postsecondary students, by number of years between high school graduation and first postsecondary enrollment

Selected student characteristics	U.S. total (excluding Puerto Rico)	Total (50 states, DC, and Puerto Rico)	No delay	Duration of delay				
				Any delay	1 year	2–4 years	5–9 years	10 or more years
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Gender								
Male	45.2	45.1	46.4	42.6	46.3	51.0	43.9	33.6
Female	54.8	54.9	53.6	57.4	53.7	49.0	56.1	66.4
Race/ethnicity[1]								
American Indian	0.8	0.8	0.5	1.2	1.0	1.9	0.9	1.1
Asian/Pacific Islander	4.8	4.7	4.7	3.4	3.9	2.8	4.3	2.8
Black	12.0	11.9	9.6	13.8	15.8	15.9	15.7	9.8
Hispanic	10.8	12.1	12.3	11.5	16.7	12.6	9.8	7.9
White	71.4	70.3	72.6	69.8	62.0	66.8	69.2	78.1
Other[2]	0.3	0.3	0.2	0.3	0.6	0.1	0.2	0.3
Income level in 1994								
Bottom 25 percent	26.2	27.0	24.0	29.4	41.7	37.8	25.8	16.6
Middle 50 percent	51.8	51.3	51.2	53.7	45.3	52.1	66.8	53.9
Top 25 percent	22.0	21.7	24.8	16.9	13.0	10.1	7.4	29.6
Parents' highest education level								
High school diploma or less	44.0	44.4	33.2	64.2	44.1	58.3	61.9	85.2
Some postsecondary education	19.2	19.1	20.4	16.8	24.5	18.6	20.4	7.4
Bachelor's degree or higher	36.8	36.6	46.4	19.1	31.4	23.0	17.6	7.4
Primary language								
English	89.4	89.3	91.1	87.6	82.6	86.7	89.4	91.1
Not English	10.6	10.7	8.9	12.4	17.4	13.3	10.6	8.9

[1] American Indian includes Alaska Native, Black includes African American, Asian/Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin unless specified.

[2] Students were given the opportunity to list a specific racial/ethnic identification under "Other."

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

A clear inverse relationship between parents' education levels and the length of delay was apparent. The likelihood of having a parent who had never attended college increased sharply in each successive delay group from 44 percent of those who delayed 1 year to 85 percent of those who delayed 10 or more years.

Examining racial/ethnic group differences revealed that the proportion of White students rose as the duration of delay increased. Among those who delayed no more than 1 year, 62 percent were White, compared with 78 percent of those who delayed 10 or more years. Consistent with the increase in the proportion of White students was the decline in the proportion of students who spoke a foreign language while growing up. Seventeen percent of students who delayed 1 year spoke a foreign language as a child, compared with 9 percent of those who delayed 10 or more years.

In summary, the length of time students waited to enroll in postsecondary education was clearly related to their race/ethnicity, income level, family responsibilities, and the level of education achieved by their parents. As the length of time between high school graduation and postsecondary enrollment increased, the likelihood of being White increased while the likelihood of being in the lowest income level and speaking a foreign language while growing up declined. Taken together, these results suggest that the delayed entrants who delay less time may be at a greater socioeconomic disadvantage than those who delayed longer. On the other hand, the trend showing a decline in parents' education levels with the length of time delayed also suggests that short-term delayed entrants are more likely to experience the advantage of having parents who have attended college, relative to their peers who delayed longer.

Enrollment Characteristics

When asked to report the highest level of education they ever expected to complete, delayed entrants reported relatively high educational expectations. Nearly 6 in 10 hoped to earn a bachelor's degree (28 percent) or aspired to an advanced degree (29 percent) (table 6). Aspirations for advanced degrees, however, declined with the length of time between high school graduation and postsecondary enrollment—from 42 percent of those who delayed 1 year to 13 percent of those who delayed a decade or more—while aspirations for credentials below a bachelor's degree increased from 13 percent to 48 percent for the same groups. The results indicate that as delayed entrants age, they tend to look to postsecondary education for vocational training, while those who delay less than 5 years are likely to carry aspirations for bachelor's degrees or even advanced degrees.

To some extent, the types of postsecondary programs delayed entrants first attended paralleled their educational expectations. For example, when students first enrolled in postsecondary education, the likelihood of being enrolled in a bachelor's degree program declined with each successive delay group. Nearly one-third (30 percent) of those who delayed no more than 1 year were pursuing bachelor's degrees, compared with 8 percent of those who

Table 6. Percentage distributions of enrollment characteristics of 1995–96 beginning postsecondary students, by number of years between high school graduation and first postsecondary enrollment

Enrollment characteristics	U.S. total (excluding Puerto Rico)	Total (50 states, DC, and Puerto Rico)	No delay	Duration of delay: Any delay	1 year	2–4 years	5–9 years	10 or more years
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Type of first institution								
Public 2-year	45.9	45.5	52.0	56.2	38.7	47.5	62.5	61.5
Public 4-year	25.7	25.9	34.4	12.7	22.6	15.5	7.6	6.3
Private not-for-profit 4-year	14.6	14.8	20.8	5.6	9.5	6.5	3.1	3.5
Private for-profit	10.9	11.0	4.8	19.7	12.4	23.8	22.5	20.9
Other[1]	2.9	2.9	1.3	5.8	3.5	6.7	4.3	7.8
Degree program at first institution								
Certificate	18.2	18.2	6.7	34.2	22.6	32.2	32.9	45.4
Associate's degree (including transfer)	43.1	42.9	39.9	49.1	47.3	47.6	57.0	47.0
Bachelor's degree	38.7	38.9	53.3	16.7	30.1	20.2	10.1	7.7
Degree expected at first institution								
None	11.6	11.6	8.6	16.4	13.3	13.2	14.5	22.0
Certificate	13.9	13.8	4.8	26.0	15.3	24.8	25.1	35.3
Associate's degree	25.7	25.7	22.5	32.6	26.6	35.9	42.3	29.4
Bachelor's degree or transfer to 4-year insitution	48.9	48.9	64.0	25.0	44.9	26.1	18.0	13.3
Highest degree ever expected								
Don't know	12.0	12.0	10.5	14.4	14.1	13.8	17.3	13.5
Less than a bachelor's degree	14.7	14.6	6.2	28.9	13.3	20.6	27.7	47.9
Bachelor's degree	27.9	27.9	27.1	27.9	30.9	28.0	27.0	26.0
Advanced degree	45.4	45.5	56.3	28.7	41.8	37.6	28.1	12.5
Attendance intensity first year								
Exclusively full-time	65.3	65.6	76.3	46.0	56.2	58.8	37.9	34.7
Mixed full-time/part-time	13.9	13.8	13.6	13.8	18.9	14.4	12.5	10.2
Half-time	9.4	9.3	6.1	15.2	11.2	12.5	26.3	13.5
Less than half-time	11.4	11.3	4.0	25.0	13.6	14.3	23.4	41.5
Remedial coursetaking in first year								
Did not take courses	82.1	82.1	81.3	82.5	85.0	79.1	79.7	84.7
Took courses	17.9	17.9	18.7	17.5	15.0	21.0	20.3	15.3

[1] "Other" institutions include public less-than-2-year, private not-for-profit 2-year, and private not-for-profit less-than-2-year institutions.

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

delayed 10 or more years. Conversely, the longer students delayed enrollment, the more likely they were to pursue a program leading to a vocational certificate.

Short-term delayed entrants (i.e., less than 5 years) also differed from those who delayed longer with respect to the time they were able to spend in the classroom. Fifty-six percent and 59 percent of those who delayed 1 year and 2–4 years, respectively, attended exclusively full time during their first year of enrollment, compared with 38 percent and 35 percent, respectively, of those who delayed 5–9 years and 10 years or more. Thus, along with focusing more on short-term programs, as delayed entrants aged they spent less time attending classes.

THIS PAGE INTENTIONALLY LEFT BLANK

The Interim Years and Reasons for Enrolling

Beginning postsecondary students who waited a year or more between their high school graduation and postsecondary enrollment were asked about their activities in the interim years between high school and college. About three-quarters of those who delayed enrollment reported working, and about one-fifth said they had started or raised a family (table 7). As would be expected given the increasing age of students, the longer they delayed the more likely they were to report working, getting married, and starting or raising a family during the interim years. For example, 70 percent of students who had waited no longer than a year to enroll reported working during that time, compared with 86 percent who had delayed enrollment 10 or more years. In addition to their employment and family formation experiences, about 7 percent of delayed entrants reported serving in the military in the years between high school and college, including 1 in 10 of those who delayed 2–4 years or 5–9 years, though differences among groups were not significant.

Table 7. Percentage of 1995–96 beginning postsecondary students who reported engaging in various types of activities between high school graduation and first postsecondary enrollment, by number of years between high school graduation and postsecondary enrollment

Duration of delay	Worked	In the military	Got married	Started or raised a family
U.S. total (excluding Puerto Rico)	76.7	6.9	12.0	20.3
Total (50 states, DC, and Puerto Rico)	76.4	6.9	12.1	20.3
Years between high school graduation and first postsecondary enrollment				
1 year	70.0	5.0	3.8	8.0
2–4 years	78.1	9.6	9.1	11.6
5–9 years	80.8	9.5	14.4	24.6
10 or more years	85.6	8.0	21.6	31.6

NOTE: Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

Why They Enrolled

When asked why they decided to enroll in postsecondary education, students who delayed enrollment reported a number of important considerations for enrolling. Most were related to employment, such as training to enter the workforce, changing careers, or qualifying for a new position. Reasons related to a change in employment or enhancing job opportunities tended to be reported by those who delayed longer (i.e., those with more experience in the workforce), while training to enter the workforce was reported more often by those who delayed a shorter amount of time. Specifically, students who reported enrolling to change careers or improve job skills were more likely to do so as the duration of time between high school graduation and postsecondary enrollment increased (table 8). For example, a change of career was reported by 9 percent of those who delayed 1 year and 24 percent for those who delayed 10 or more years. Conversely the likelihood of reporting the need for training to enter the workforce declined with the duration of time between high school and college, from 36 percent for those who delayed 1 year to 17 percent for those who delayed 10 or more years.

Table 8. Percentage of 1995–96 beginning postsecondary students who reported various reasons as important for enrolling in postsecondary education, by number of years between high school graduation and first postsecondary enrollment

Duration of delay	Personal satisfaction of earning degree	Training to enter workforce	Improve job skills	Qualify for new job	Change careers
U.S. total (excluding Puerto Rico)	28.1	28.0	23.8	15.8	16.2
Total (50 states, DC, and Puerto Rico)	28.1	28.2	23.7	15.8	16.1
Years between high school graduation and first postsecondary enrollment					
1 year	26.1	35.6	15.6	16.6	9.4
2–4 years	25.0	36.1	21.1	14.4	15.0
5–9 years	31.6	26.6	26.4	16.8	19.6
10 or more years	28.9	17.4	30.0	16.9	23.7

NOTE: Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

Outside of work-related reasons, nearly 3 in 10 students (28 percent) reported enrolling in postsecondary education to experience the personal satisfaction of earning a degree. No significant difference was detected among delay groups in the likelihood of reporting this as an important reason for enrolling, however.

Persistence and Degree Completion

Among students who first enrolled in postsecondary education in 1995–96, about one-half (51 percent) had completed a postsecondary credential within 6 years of first enrolling, including 29 percent who had attained a bachelor's degree, 10 percent who had attained an associate's degree, and 12 percent who earned a certificate (table 9). Another 14 percent had not attained a degree but were still enrolled: 9 percent were in a 4-year college, and 6 percent were enrolled in subbaccalaureate institutions. The remaining 35 percent had not attained a degree and were no longer enrolled as of 2001. It is possible these students returned later (i.e., were "stopouts"), but as of 6 years after their first enrollment, they had left without earning a degree.

Table 9. Percentage distribution of 1995–96 beginning postsecondary students who completed postsecondary credentials or were still enrolled in postsecondary education as of 2001, by number of years between high school graduation and first postsecondary enrollment

Persistence, attainment, and enrollment status	U.S. total (excluding Puerto Rico)	Total (50 states, DC, and Puerto Rico)	No delay	Duration of delay				
				Any delay	1 year	2–4 years	5–9 years	10 or more years
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Persistence and attainment as of 2001								
Attained any degree	50.9	50.9	57.5	39.9	43.3	41.1	35.7	38.8
Attained bachelor's degree	29.0	28.8	41.9	8.6	19.9	7.5	5.6	2.4
Attained associate's degree	9.8	10.0	10.3	9.6	9.3	10.9	8.4	9.6
Attained certificate	12.1	12.1	5.4	21.7	14.1	22.7	21.8	26.8
Never attained, still enrolled	14.4	14.4	15.4	13.4	16.0	17.4	13.1	9.0
Never attained, enrolled at 4-year institution	8.7	8.8	10.5	6.1	8.2	9.8	3.6	3.4
Never attained, enrolled at less-than-4-year institution	5.7	5.6	4.9	7.3	7.8	7.6	9.5	5.5
Never attained, not enrolled	34.7	34.7	27.1	46.7	40.7	41.5	51.2	52.2

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

Given delayed entrants' lower levels of high school academic preparation relative to immediate entrants, one would expect delayed entrants not to be as successful at completing their postsecondary education.[14] Indeed, while a majority (58 percent) of students who did not delay enrollment had completed a degree within 6 years, 40 percent of delayed entrants had done so. Looking at specific types of credentials, delayed entrants were more likely than immediate entrants to earn a vocational certificate (22 vs. 5 percent)—which is consistent with delayed entrants' greater emphasis on vocational training—and they were much less likely to attain a bachelor's degree (9 vs. 42 percent). In contrast, the likelihood of completing an associate's degree was not related to delayed enrollment; about 1 in 10 delayed and immediate entrants completed an associate's degree within 6 years.

When taking persistence into account (i.e., earning a credential *or* still being enrolled), students who delayed enrollment were still less successful than immediate entrants in persisting in their postsecondary programs. Nearly half (47 percent) of delayed entrants had left their postsecondary program without earning a credential, compared with roughly one-quarter (27 percent) of students who did not delay.

Because of the relatively small sample sizes, it was difficult to detect an association between postsecondary persistence and the length of time students delayed enrollment. No differences could be detected among the delay groups in their likelihood of completing a credential. However, when specific degrees were examined, consistent with the decreasing tendency to enroll in bachelor's degree programs as the length of delay increased, the likelihood of earning a bachelor's degree declined. Conversely, the likelihood of completing a vocational certificate increased with the duration of delay. While it appears as though the likelihood of leaving postsecondary education without a credential increases with the length of delay, the result is not statistically significant.

To better assess differences in program completion with respect to the duration of delay, it is necessary to take into account several related variables, especially degree goals and the type of institutions where students first enrolled. However, the BPS sample size of delayed entrants is too small to disaggregate in such a way. Therefore, to take into account the interrelationship between delayed enrollment and other characteristics related to the likelihood of persisting and completing a postsecondary degree, a multivariate analysis was conducted.

[14] In addition, as shown in table 6, delayed entrants were also less likely to attend exclusively full time (46 vs. 76 percent) and more likely report that they did not expect to obtain a degree at the institution they currently attended (16 vs. 9 percent).

Controlling for Related Variables

The multivariate approach used for this study is sometimes referred to as "commonality analysis," where multiple linear regression is used to adjust for the common variation among a group of independent variables. (See appendix B for a detailed description of the methodology used.) The independent variables were selected based on the tabular analysis discussed in the preceding sections of the report, rather than on a theoretical model. Two analyses were performed. In both analyses, the dependent variable was a dichotomous outcome (yes/no)—that is, the student completed a postsecondary credential or was still enrolled 6 years after first enrolling in postsecondary education.[15]

The main independent variable in both analyses was an indicator of delayed enrollment. The first analysis used a dichotomous version, while the second analysis disaggregated delay into the same categories used for the bivariate analysis. Other variables included demographic and socioeconomic characteristics (gender, race/ethnicity, income, and language spoken as a child); attendance and enrollment characteristics (attendance intensity, degree program, and educational expectations); and remedial coursetaking as a proxy for academic preparation.

The results of the first multivariate analysis are shown in table 10. The italicized category for each variable is the reference group against which all comparisons and tests of statistical significance are made. The first column displays the unadjusted percentages—that is, the proportion of students who had either completed a postsecondary degree or certificate or were still enrolled 6 years after they began. The second column displays the least squares coefficient as a percentage. Significant coefficients represent the observed differences that remain between the analysis group (such as those who delayed enrollment) and the comparison group (did not delay) after controlling for the relationships of all the selected independent variables. If asterisks appear in both columns, it means that even after controlling for related variables, a particular variable is associated with the outcome, in this case, the completion of a credential or being enrolled 6 years after first enrollment.

As displayed in the first column, before taking the covariation of related variables into account, students who did not delay were more likely than those who did to have attained a postsecondary credential: 73 percent of students who did not delay had attained or were still enrolled 6 years after initial enrollment, compared with 53 percent of students who did delay. However, even after the covariation of related variables was controlled, students who delayed

[15]Although the DAS simplifies the process of conducting a linear regression analysis, it also limits the range of procedures that can be used. The least squares regression procedure used in this analysis is sometimes sufficient for binary outcomes (such as the outcome studied here). However, when the proportion of the sample participating in the outcome is very low or very high, logit or probit procedures are preferred. See appendix B for more details.

Table 10. Percentage of 1995–96 beginning postsecondary students who completed a postsecondary credential or were still enrolled in 2001, and least squares coefficients and standard errors, by timing of their postsecondary enrollment and other selected student and enrollment characteristics

Selected student and enrollment characteristics[1]	Unadjusted percentage	Least squares coefficient[2]	Standard error[3]
Total	65.2	56.20	3.05
Delayed enrollment after high school			
No delay	*72.9*	*†*	*†*
Delayed 1 or more years	53.1*	-6.30*	2.57
Gender			
Male	*64.9*	*†*	*†*
Female	65.5	3.20*	1.61
Race/ethnicity[4]			
Black	54.7*	-10.40*	2.57
Hispanic	61.1	-7.90*	2.89
Asian/Pacific Islander	74.0	-2.50	4.50
American Indian/Alaska Native	58.5	-6.00	9.33
Other[5]	79.6	0.30	9.00
White	*67.0*	*†*	*†*
Income level			
Bottom 25 percent	62.8	-0.30	2.09
Middle 50 percent	*64.5*	*†*	*†*
Top 25 percent	70.3*	-0.50	2.25
Parents' highest education level			
High school diploma or less	*57.2*	*†*	*†*
Some postsecondary education	60.4	0.40	2.25
Bachelor's degree	75.2*	10.00*	2.41
Advanced degree	83.1*	13.90*	2.73
Dependency status and marital status in 1995–96			
Dependent	*71.3*	*†*	*†*
Independent, no dependents, unmarried	57.0*	2.90	4.18
Independent, no dependents, married	43.8*	-7.50	4.66
Independent with dependents	*51.6**	-0.20	3.05
Primary language			
English	*64.9*	*†*	*†*
Non-English	70.0	10.00*	3.38

See notes at end of table.

Table 10. Percentage of 1995–96 beginning postsecondary students who completed a postsecondary credential or were still enrolled in 2001, and least squares coefficients and standard errors, by timing of their postsecondary enrollment and other selected student and enrollment characteristics—Continued

Selected student and enrollment characteristics[1]	Unadjusted percentage	Least squares coefficient[2]	Standard error[3]
Type of first institution			
Public 2-year	*53.1*	*†*	*†*
Public 4-year	77.5*	10.90*	2.57
Private not-for-profit 4-year	82.8*	13.40*	3.05
Private for-profit	63.3*	11.20*	3.05
Other[6]	63.9*	13.10*	5.14
Attendance status in 1995–96			
Full-time	*72.4*	*†*	*†*
Part-time only	43.6*	-14.20*	2.41
Mixed full- and part-time	66.3*	1.70	2.57
Degree expected at first institution			
None	43.7*	-13.60*	2.73
Associate's or certificate	*58.2*	*†*	*†*
Bachelor's degree or transfer	77.0*	2.20	2.57
Highest degree ever expected in 1995–96			
Less than bachelor's degree	*47.5*	*†*	*†*
Bachelor's degree or higher	70.1*	7.00*	2.09
Remedial coursetaking in first year			
Did not take courses	*67.8*	*†*	*†*
Took courses	56.4*	-8.30*	2.09

† Not applicable for the reference group.

* $p \leq .05$.

[1] The italicized group in each category is the reference group being compared.

[2] Least squares coefficients, multiplied by 100 to reflect percentage. The first entry in the total row is the intercept term. Significant coefficients represent the observed differences that remain between the analysis group (such as those who delayed enrollment) and the comparison group (did not delay) after controlling for the relationships of all the selected independent variables. The coefficient for delayed 1 or more years is -6.3, which means delayed entrants might be expected to complete or persist at a rate about 6 percent lower than those who do not delay.

[3] Standard error of least squares coefficient, adjusted for design effect, multiplied by 100 to reflect percentage (see appendix B).

[4] American Indian includes Alaska Native, Black includes African American, Asian/Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin unless specified.

[5] Students were given the opportunity to list a specific racial/ethnic identification under "Other."

[6] "Other" institutions include public less-than-2-year, private not-for-profit 2-year, and private not-for-profit less-than-2-year institutions.

NOTE: Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01) Data Analysis System.

postsecondary enrollment remained significantly less likely to complete a degree or still be enrolled 6 years after enrollment than their peers who did not delay. The results demonstrate a clear difference in the likelihood of completing a postsecondary credential between students who enroll in postsecondary education immediately after high school graduation and those who delay their enrollment.

The next analysis attempts to determine whether the negative association between delayed enrollment and postsecondary success can be attributed to specific groups of delayed entrants. The analysis is exactly the same as the first one with the exception of disaggregating delayed entrants into the same categories as analyzed in the bivariate analysis: 1 year, 2–4 years, 5–9 years, and 10 or more years. Again, the comparison group is immediate entrants. The results shown in table 11 indicate that, while the least squares coefficients for all the delayed categories are negative relative to immediate entrants, only the coefficient for students who delayed 1 year remained statistically significant. In other words, delayed entrants who delayed their enrollment no more than 1 year remained significantly less likely than immediate entrants to complete a degree or stay enrolled, while the analysis could not detect a significant difference for longer delay groups. The implication is that the youngest group of delayed entrants may be more at risk of not completing their postsecondary education than those who delayed longer. This result is consistent with the tabular analysis showing students who delayed a shorter length of time at a greater disadvantaged than those who delayed longer with respect to socioeconomic characteristics. That is, the longer students waited to enroll, the less likely they were to be in the lowest income group and the more likely they were to be White.

In addition to delayed enrollment, several other variables remained significantly associated with completing postsecondary education after controlling for the independent variables. Specifically, students who attended public 2-year institutions were less likely than students who attended all other types of institutions to either complete a credential or still be enrolled after 6 years. Students who attended exclusively part time were much less likely to complete or persist in postsecondary education than their full-time counterparts, as were those who aspired to a shorter term degree or certificate relative to those who sought to attain a bachelor's degree. Not surprisingly, students who did not expect to earn a credential at their first institution were less likely than those who did have such an expectation to earn any credential. Also, students who took remedial courses were less likely than their counterparts who took no remedial courses to complete a degree or persist in postsecondary education. Students who spoke a foreign language while growing up did better than their English-speaking peers, after the multivariate analysis, but the difference in the bivariate comparison was not statistically significant.

Table 11. Percentage of 1995–96 beginning postsecondary students who completed a postsecondary credential or were still enrolled in 2001, and least squares coefficients and standard errors, by number of years between high school graduation and first postsecondary enrollment and other selected student and enrollment characteristics

Selected student and enrollment characteristics[1]	Unadjusted percentage	Least squares coefficient[2]	Standard error[3]
Total	65.2	56.10	3.05
Years delayed enrollment after high school			
No delay	*72.9*	*†*	*†*
No more than 1 year	59.2*	-6.80*	3.05
2–4 years	58.6*	-4.90	3.54
5–9 years	48.0*	-9.10	4.66
10 or more years	47.8*	-5.90	4.50
Gender			
Male	*64.9*	*†*	*†*
Female	65.5	3.20*	1.61
Race/ethnicity[4]			
Black	54.7*	-10.40*	2.57
Hispanic	61.1	-7.80*	2.89
Asian/Pacific Islander	74.0	-2.40	4.50
American Indian/Alaska Native	58.5	-6.10	9.33
Other[5]	79.6	0.10	9.00
White	*67.0*	*†*	*†*
Income level			
Bottom 25 percent	62.8	-0.40	2.09
Middle 50 percent	*64.5*	*†*	*†*
Top 25 percent	70.3*	-0.60	2.25
Parents' highest education level			
High school diploma or less	*57.2*	*†*	*†*
Some postsecondary education	60.4	0.60	2.25
Bachelor's degree	75.2*	10.00*	2.41
Advanced degree	83.1*	14.10*	2.73
Dependency status and marital status in 1995–96			
Dependent	*71.3*	*†*	*†*
Independent, no dependents, unmarried	57.0*	3.60	4.66
Independent, no dependents, married	43.8*	-7.30	5.14
Independent with dependents	51.6*	0.10	3.54
Primary language			
English	*64.9*	*†*	*†*
Non-English	70.0	10.1*	3.38

See notes at end of table.

Table 11. Percentage of 1995–96 beginning postsecondary students who completed a postsecondary credential or were still enrolled in 2001, and least squares coefficients and standard errors, by number of years between high school graduation and first postsecondary enrollment and other selected student and enrollment characteristics—Continued

Selected student and enrollment characteristics[1]	Unadjusted percentage[2]	Least squares coefficient[3]	Standard error[4]
Type of first institution			
Public 2-year	*53.1*	*†*	*†*
Public 4-year	77.5*	10.90*	2.57
Private not-for-profit 4-year	82.8*	13.40*	3.05
Private for-profit	63.3*	11.10*	3.05
Other[6]	63.9*	12.90*	5.14
Attendance status in 1995–96			
Full-time	*72.4*	*†*	*†*
Part-time only	43.6*	-14.20*	2.41
Mixed full- and part-time	66.3*	1.70	2.57
Degree expected at first institution			
None	43.7*	-13.60*	2.73
Associate's or certificate	*58.2*	*†*	*†*
Bachelor's degree or transfer	77.0*	2.20	2.57
Highest degree ever expected in 1995–96			
Less than bachelor's degree	*47.5*	*†*	*†*
Bachelor's degree or higher	70.1*	7.00*	2.09
Remedial coursetaking in first year			
Did not take courses	*67.8*	*†*	*†*
Took courses	56.4*	-8.40*	2.25

† Not applicable for the reference group.

* $p \leq .05$.

[1] The italicized group in each category is the reference group being compared.

[2] Least squares coefficients, multiplied by 100 to reflect percentage. The first entry in the total row is the intercept term. Significant coefficients represent the observed differences that remain between the analysis group (such as those who delayed enrollment) and the comparison group (did not delay) after controlling for the relationships of all the selected independent variables. The coefficient for delayed no more than 1 year is -6.8, which means delayed entrants might be expected to complete or persist at a rate about 7 percent lower than those who do not delay.

[3] Standard error of least squares coefficient, adjusted for design effect, multiplied by 100 to reflect percentage (see appendix B).

[4] American Indian includes Alaska Native, Black includes African American, Asian/Pacific Islander includes Native Hawaiian, and Hispanic includes Latino. Race categories exclude Hispanic origin unless specified.

[5] Students were given the opportunity to list a specific racial/ethnic identification under "Other."

[6] "Other" institutions include public less-than-2-year, private not-for-profit 2-year, and private not-for-profit less-than-2-year institutions.

NOTE: Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01) Data Analysis System.

The results of the multivariate commonality analysis confirmed that delayed entrants in the aggregate are less successful in completing their postsecondary education relative to their peers who enroll in postsecondary education soon after high school graduation. However, when delayed entrants were broken out by the length of time they waited to enroll, only students who delayed no more than a year remained significantly less likely than immediate entrants to complete a degree or persist in postsecondary education.

THIS PAGE INTENTIONALLY LEFT BLANK

Summary and Conclusions

The findings from this study clearly demonstrate that students who delay their postsecondary enrollment a year or more after high school graduation differ fundamentally from those who enroll immediately. Early on, delayed entrants are more likely than immediate entrants to have family and educational experiences that place them at greater risk for dropping out of high school. In addition, based on high school curriculum measures such as the highest mathematics courses completed and overall academic rigor, delayed entrants are much less likely to be academically prepared to undertake college-level work. When delayed entrants do enroll in postsecondary education they are likely to do so to gain or enhance their work skills by enrolling in shorter term vocational programs rather than by enrolling in bachelor's degree programs.

However, delayed entrants are not a homogeneous group. The number of years students wait to enroll in college varies with their demographic characteristics and educational expectations. In general, as the length of delay increases, students are more likely to be White, less likely to be in the lowest income group, and less likely to speak a foreign language while growing up. At the same time, younger delayed entrants tended to be from families where at least one parent held a bachelor's degree more often than their older counterparts.

Educational expectations tended to decline with the length of delay. Correspondingly, the longer delayed entrants waited to enroll in postsecondary education, the less likely they were to enroll in bachelor's degree programs, and the more likely they were to enroll in vocational certificate programs. Furthermore, older delayed entrants were less likely than their younger peers to attend classes full time when they did enroll.

While delayed entrants as a whole were less successful than immediate entrants in completing a degree or remaining enrolled in their postsecondary program, based on the multivariate analysis, students who delayed the shortest amount of time—those who delayed no more than 1 year after high school graduation—remained significantly less likely to complete a degree or persist while the results for those who delayed longer were not conclusive. Delayed entrants who wait no more than 1 year to enroll in postsecondary education are typically 19 years old and nearly one-fifth already have children of their own. Compared with students who delay longer, they have had less time to gain life and work experiences, which may provide additional motivation and resources to older students. Nevertheless, despite their disadvantages, a substantial proportion—43 percent—of students who delayed their postsecondary enrollment no

more than 1 year had successfully completed a postsecondary credential, including one-fifth who earned a bachelor's degree in 6 years.

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., Daniel, B., and Berkovits, I. (2003). *Postsecondary Attainment, Attendance, Curriculum, and Performance: Selected Results From the Postsecondary Education Transcript Study (PETS), 2000* (NCES 2003–394). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Berkner, L., and Chavez, L. (1998). *Access to Postsecondary Education for the 1992 High School Graduates* (NCES 98–105). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Berkner, L.K., Cuccaro-Alamin, S., and McCormick, A.C. (1996). *Descriptive Summary of 1989–90 Beginning Postsecondary Students 5 Years Later: With an Essay on Postsecondary Persistence and Attainment* (NCES 96–155). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Berkner, L.K., He, S., and Cataldi, E.F. (2002). *Descriptive Summary of 1995–96 Beginning Postsecondary Students Six Years Later* (NCES 2003–151). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Burkam, D., and Lee, V. (2003). *Mathematics, Foreign Language, and Science Coursetaking and the NELS:88 Transcript Data* (NCES 2003–01). U.S. Department of Education. Washington, DC: National Center for Education Statistics Working Paper.

Carroll, C.D. (1989). *College Persistence and Degree Attainment for 1980 High School Graduates: Hazards for Transfers, Stopouts, and Part-Timers* (NCES 89–302). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Horn, L.J. (1996). *Nontraditional Undergraduates: Trends in Enrollment from 1986 to 1992 and Persistence and Attainment Among 1989–90 Beginning Postsecondary Students* (NCES 97–578). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Horn, L., and Premo, M. (1996). *Profile of Undergraduates in U.S. Postsecondary Education Institutions: 1992–93* (NCES 97–237). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Kaufman, P., Bradby, D., and Owings, J. (1992). *Characteristics of At-Risk Students in NELS:88* (NCES 92–042). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Tuma, J., and Geis, S. (1995). *Educational Attainment of 1980 High School Sophomores by 1992* (NCES 95–304). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

Appendix A—Glossary

This glossary describes the variables used in this report. The items were taken directly from the NCES BPS: 96/98/01, the NPSAS:2000 and NELS:88/2000 Data Analysis Systems (DAS), an NCES software application that generates tables from the data (see appendix B for a description of the DAS). The glossary index lists the variables as they appear in the report for each survey. The glossary is in alphabetical order by variable name (displayed along the right-hand column).

Glossary Index

DAS Variable

High school academic preparation (NELS:88/2000) **ACCURHSQ**

A composite measure of students' highest level of mathematics, total mathematics credits, total Advanced Placement courses, total English credits, total foreign language credits, total science credits, total core laboratory science credits, total social science credits, and total computer science credits.

Scored in bottom 20 percent
Scored in middle 60 percent
Scored in top 20 percent

Institution type (NPSAS:2000) **AIDSECT**

Indicates the level and control of the institution attended. Students who attended more than one institution are coded in a separate category. For students who attended more than one institution during 1999–2000, the NPSAS sample institution may not represent where all or part of the financial aid was actually received.

Public 2-year
Public 4-year
Private not-for-profit 4-year
Private for-profit
Other
More than one institution

Attendance intensity 1999–2000 (NPSAS:2000) **ATTNPTRN**

Attendance intensity during the months enrolled in 1999–2000. Indicates whether the student was enrolled only full-time, half-time, less than half-time, or a mixed pattern. Students were considered to have enrolled exclusively full-time if they were enrolled for full-time during all enrolled months. Students were considered to have enrolled mixed full-time/part-time if they were enrolled for both full-time and part-time during enrolled months. Students were considered to have enrolled half-time if they were enrolled for half-time during all enrolled months. Students were considered to have enrolled exclusively less than half-time if they were enrolled for less than half-time during all enrolled months.

Exclusively full-time
Half-time
Less than half-time
Mixed

Attendance intensity 1995–96 (BPS:96/2001) **ATTNPTRN**

Same as NPSAS variable described above except for the 1995–96 academic year

DAS Variable

Risk of dropping out of high school (NELS:88/2000) **BYRISK2**

The sum of six possible risk characteristics associated with dropping out of high school. All factors were identified when the student was in the 8th grade except sibling dropout status, which was identified in the 10th grade. The risk factors include: in the lowest 25 percent on the socioeconomic indicator, living with a single parent, having an older sibling who dropped out of high school, changed schools two or more times, average grade of C or lower in 6th to 8th grade, or repeated a grade between kindergarten and 8th grade.

College qualification index (NELS:88/2000) **CQCOMV2**

A composite index of 4-year college readiness or qualification based on the five measures of academic performance: cumulative academic coursework GPAs, senior class rank, the NELS 1992 test scores, and the SAT and ACT college entrance examination scores. Since admission standards and requirements vary widely among 4-year colleges and universities, the approach used here was to examine the actual distribution of these five measures of academic aptitude and achievement among those graduating seniors who did attend a 4-year college or university. Data sources were available for approximately half (45 percent) of the NELS graduating seniors for four or five of the criteria: class rank, GPA, the NELS test, and ACT or SAT scores or both. For about one-third of the seniors there were only three data sources available because they had no ACT or SAT scores. All of these students had NELS test scores, however. In order to identify as many students as possible who were potentially academically qualified for a 4-year college, even if data were missing for these students on some of the criteria, the seniors were classified according to the *highest* level they had achieved on *any* of the five criteria for which data were present.

- *Not qualified*: those who had no value on any criterion that would put them among the top 75 percent of 4-year college students (i.e., all values were in the lowest quartile). In a few instances either because of missing data or because students were considered special admissions, about 10 percent of the students who were identified as not qualified had enrolled in 4-year institutions.
- *Bottom 25 percent*: those whose highest value on any of the five criteria would put them among the top 75 percent of 4-year college students for that criterion. Minimum values were GPA=2.7, class rank percentile=54, NELS test percentile=56, combined SAT=820, composite ACT=19.
- *Middle 50 percent*: those whose highest value on any of the five criteria would put them among the top 50 percent of 4-year college students for that criterion. Minimum values were GPA=3.2, class rank percentile=76, NELS test percentile=56, combined SAT=960, composite ACT=22.
- *Top 25 percent*: those whose highest value on any of the five criteria would put them among the top 25 percent of 4-year college students for that criterion. Minimum values were GPA=3.6, class rank percentile=89, NELS test percentile=90, combined SAT=1110, composite ACT=25.

Activities during interim years between high school graduation and postsecondary enrollment (BPS:96/2001)

Started or raised a family (BPS:96/2001) **DAFAMILY**

During delay between high school and postsecondary enrollment, respondent started and/or raised a family (Yes/No).

Got married (BPS:96/2001) **DAMARRY**

During delay between high school and postsecondary enrollment, respondent got married (Yes/No).

DAS Variable

Activities during interim years between high school graduation and postsecondary enrollment (BPS:96/2001)—Cont.

Military service (BPS:96/2001) **DAMILIT**

During delay between high school and postsecondary enrollment, respondent served in the military (Yes/No).

Worked (BPS:96/2001) **DAWORKED**

During delay between high school and postsecondary enrollment, respondent worked (Yes/No).

Degree program (NPSAS:2000) **DEGFIRST**

Degree program in which student was enrolled, as reported by the student or indicated by the NPSAS sample institution. If not available from the institution, information was taken from student interview. Refers to NPSAS institution for those enrolled in more than one institution.

No degree program	Student is not in any of the above degree programs.
Certificate	Student pursuing a certificate or formal award other than an associate's or bachelor's degree.
Associate's degree	Student pursuing an associate's degree.
Bachelor's degree	Student pursuing a Bachelor of Arts or Bachelor of Science degree.

Delayed enrollment (NPSAS:2000) **DELAYENR**

Number of years between the year of high school graduation and the year of first postsecondary enrollment. Derived by subtracting the calendar year of postsecondary enrollment from the calendar year of high school graduation. For a small percentage of students who are identified as having delayed 1 year, the length of delay is less than a year. For example, if a student graduated from high school in June 1999 and enrolled in college in January 2000, that student is identified as delaying for a year even though only 6 months had elapsed. Because of frequent discrepancies found when comparing birth year, high school graduation year, and first year of postsecondary education as reported by the CADE (institution data) and the CATI (student reported data), the two date variables required editing and imputation. If the date of first postsecondary enrollment differed for CADE and CATI, the earliest date was identified as the enrollment date. For the date of high school graduation, 11 percent (unweighted) of missing or out-of-range values were imputed by stochastic imputation. For this analysis, the CATI weight was used, which means only the students who participated in the student interview were included in the analysis and therefore, more than one source of data was available to identify the dates of high school graduation and postsecondary enrollment.

No delay	Enrolled within the same calendar year after high school graduation
Any delay	At least one calendar year elapsed between high school graduation and postsecondary enrollment

DAS Variable

Dependency and marital status (NPSAS:2000) **DEPEND5B**

Identifies independent students by marital status and dependents. Married but separated students are classified as unmarried.

Dependent (for definition of dependent, see entry for SBDEP1Y1)
Independent
Unmarried, no dependents
Unmarried, dependents
Married, no dependents
Married, dependents

Degree expected at first institution (BPS:96/2001) **DGEXPY1**

Highest degree expected at the first institution attended in 1995−96.

None
Certificate
Associate's degree
Bachelor's or transfer to 4-year

First degree program 1995–96 (BPS:96/2001) **DGPGMY1**

First type of degree program at the first institution attended in 1995−96.

Certificate
Associate's degree (including transfer)
Bachelor's degree

Delayed enrollment (BPS:96/2001) **ENDELAYN**

Respondents who received their high school diploma prior to 1995 or reached the age 20 before December 31, 1995 were identified as delayed entrants. The number of years between the year of high school (HS) graduation and the year of first postsecondary enrollment was derived by subtracting the calendar year of postsecondary enrollment from the calendar year of high school (HS) graduation. Dates were provided by the students in the CATI interview. If student-reported information was missing, dates were obtained from the institutional (CADE) record or financial aid form. For a small percentage of students who are identified as having delayed 1 year, the length of delay is less than a year. For example, if a student graduated from high school in June 1995 and enrolled in college in January 1996, that student is identified as delaying for a year even though only 6 months had elapsed.

No delay	Enrolled within the same calendar year after HS graduation
1 year delay	Enrolled in the calendar year following HS graduation
2 to 4 year delay	Enrolled 2 to 4 calendar years following HS graduation
5 to 9 year delay	Enrolled 5 to 9 calendar years following HS graduation
10 or more year delay	Enrolled 10 or more calendar years following HS graduation

DAS Variable

Work intensity (NPSAS:2000) **ENRJOB3**

Categories of intensity of working while enrolled, including unreported work-study job hours (estimated at 15 hours per week).

Did not work
Worked 30 hours/week or less
Worked more than 30 hours/week

Highest degree ever expected 1995–96 (BPS:96/2001) **EPHDEGY1**

Response to the question "What is the highest level of education you ever expect to complete?"

Don't know
Less than bachelor's degree
Bachelor's degree
Advanced degree

Socioeconomic status in 1992 (NELS:88/2000) **F2SES1**

A composite variable based on household income, parents' occupations and education levels, and selected items that exist in the house such as a home computer. If sufficient information existed in the parent file, the variable was created from base year parent's education (BYPQ30-31), occupation (BYPQ34B & 37B) and total household income (BYPQ80). If that information was not adequate, the variable was based on the student-reported parent's education (BYS34A-B) and occupation (BYS4B & 7B) as well as the number of selected items that exist in the household (BYS35A-P). If neither parent nor student base year files had sufficient information, data from second followup (F2) new student supplement file was used.

High school completion date (NELS:88/2000) **F3HSCPDT**

Year and month (YYMM) that the sample member completed high school. It includes award dates for high school diploma, GED, and certificates. Special values are used to indicate instances where the sample member has not received any of these or where the date of award is not known. If this information was collected in 1994 for a sample member, the 1994 data were used. Otherwise, 1992 transcript and questionnaire data were used to limit sample members to those who completed high school by June 30, 1992. The analysis refers to these students as 1992 high school graduates, but a very small percentage had completed a GED or certificate of completion.

Date first attended postsecondary education (NELS:88/2000) **F4EFMY**

Date of first attendance in postsecondary education of those respondents who attended a postsecondary institution. Used to filter the analysis sample to those who enrolled by 1994. This variable was used to identify students who delayed enrollment (i.e., enrolled on or after January 1993).[1]

[1] There are two other variables in the NELS DAS that identify delayed enrollment (DELAYTRI and DELAY). However, the postsecondary enrollment date used for these variables is extracted from postsecondary transcripts. Because we did not want to limit the sample only to those who had postsecondary transcripts, we used the self-reported date of postsecondary enrollment to compute the number of years delayed. Preliminary crosstabulations using all the delay variables produced similar findings with respect to differences in academic preparation.

DAS Variable

Sex (NPSAS:2000) **GENDER**

Male
Female

Type of first institution (BPS:96/2001) **ITNPSAS**

Level and control of the NPSAS institution.

Public 2-year
Public 4-year
Private not-for-profit 4-year
Private for-profit less-than-4-year
Other (less-than-2-year and private not-for-profit less-than-4-year institutions)

Highest mathematics course completed (NELS:88/2000) **MTHQUAL8**

Describes the level of the highest mathematics student took, based on high school transcript.

No mathematics/low or nonacademic	Student did not take any mathematics courses; took nonacademic or low academic courses including those classified as "general mathematics" or "basic skills mathematics"; low academic courses which comprise preliminary (e.g., pre-algebra) or reduced rigor/pace mathematics courses (algebra 1 that is spread over 2 academic years, and "informal geometry").
Courses through algebra 2	Completed 3 years of mathematics including algebra 1 and geometry, or 2 years of unified mathematics, and algebra 2 or a third year of a unified mathematics program.
Any advanced course beyond algebra 2	Took at least one of any courses labeled as "advanced," including various trigonometry, probability, statistics, introductory analysis or precalculus, algebra 3, or calculus courses.

Primary language (NPSAS:2000) **NBLANG**

Student's response to the question "What language was spoken most often at home as you were growing up?" Asked by student CATI.

English
Not English (see SBLANG for detailed list of languages)

Ever taken a remedial course (NPSAS:2000) **NEREMEVR**

Student's response to the question: "Since you've been in college, have you ever taken remedial or developmental courses to improve your basic skills, such as in mathematics, reading, or writing?" (Yes/No).

DAS Variable

Either parent's education (BPS:96/2001) **PAREDUC**

Highest educational level achieved by either or both parents.

High school diploma or less
Some postsecondary education
Bachelor's degree or higher

Parents' education (BPS:96/2001) **PBEDHI3**

The highest level of education completed by the student's mother or father, whoever had the highest level. The variable was aggregated to the following categories in this report:

High school diploma or less
Some postsecondary education including associate's degree or certificate
Bachelor's degree
Advanced degree

Parents' education (NPSAS:2000) **NPARED**

See PDEDHI3 above.

Income level (BPS:96/2001) **PCTALL2**

Indicates 1994 income percentile ranges for all students' income (calculated separately for dependents and independents) and merged into a single variable.

Low	Income at the 25th percentile or below.
Middle	Income at the 26th to 74th percentile.
High	Income at or above the 75th percentile.

Income level (Dependent) (NPSAS:2000) **PCTDEP**

Indicates income percentiles for parents of dependent students.
See PCTALL2 above for levels

Income level (Independent) (NPSAS:2000) **PCTINDEP**

Indicates income percentiles for independent students.
See PCTALL2 above for levels

DAS Variable

Persistence and attainment as of 2001 (BPS:96/2001) **PRENRL2B**

Indicates the highest degree the student attained or the level of the institution in which the student is still enrolled if no degree had been attained, as of June 2001. The variable was aggregated ("lumped") in three different ways:

Attained bachelor's degree
Attained associate's degree
Attained certificate
Never attained, enrolled at 4-year
Never attained, enrolled at less-than-4-year
Never attained, not enrolled

Attained any degree
Never attained, not enrolled
Never attained, enrolled

Attained or still enrolled
Never attained, not enrolled

Race/ethnicity (NPSAS:2000) **RACE2**

Specifies student's race/ethnicity, including Hispanic/Latino and those indicating more than one race. Gives priority to Hispanic/Latino regardless of race, and then to those who chose more than one race. Race categories exclude Hispanic origin unless specified.

American Indian/Alaska Native	A person having origins in any of the original peoples of North America and who maintains cultural identification through tribal affiliation or community recognition. Includes Alaska Native.
Asian	A person having origins in any of the peoples of the Far East, Southeast Asia, or the Indian subcontinent. This includes people from China, Japan, Korea, India, the Philippine Islands, and Vietnam.
Black, non-Hispanic	A person having origins in any of the black racial groups of Africa. Includes African American.
Native Hawaiian/other Pacific Islander	A person having origins in any of the Pacific Islands including Native Hawaiian, and Samoa.
White, non-Hispanic	A person having origins in any of the original peoples of Europe, North Africa, or the Middle East.
More than one race	Students were given the opportunity to pick more than one race.
Other	Students were given the opportunity to list a specific racial/ethnic identification under "Other."
Hispanic or Latino	A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin. Includes Latino.

DAS Variable

Remedial courses taken in first year (BPS:96/2001) **REMED2**

Indicates whether student reported ever having taken any remedial or developmental courses in language, mathematics, reading, or writing (Yes/No).

Reasons for enrolling in postsecondary education (yes/no) (BPS:96/2001)

Response to the question, "Why did you decide to pursue your education beyond high school?"

Personal satisfaction of earning degree (BPS:96/2001)	**RPPRESAT**
Training to enter work force (BPS:96/2001)	**RPTRAIN**
Improve job skill (BPS:96/2001)	**RPADVANC**
Qualify for new job (BPS:96/2001)	**RPNEWJOB**
To change careers (BPS:96/2001)	**RPCAREER**

Dependency status (BPS:96/2001) **SBDEP1Y1**

Dependency status 1995–96. Students were considered independent if they were: 1) age 24 or older as of 12/31/1995 (born before January 1,1972); 2) a veteran of the U.S. Armed Forces; 3) enrolled in a graduate or professional program beyond a bachelor's degree in 1995–96; 4) married; 5) an orphan or ward of the court; or 6) had legal dependents, other than spouse.

Dependent
Independent

Dependency status and marital status (BPS:96/2001) **SBDEP3Y1**

Indicates student's dependency status with presence of dependents and marital status.

Dependent
Independent, no dependent, unmarried
Independent, no dependent, married
Independent with dependents

Gender (BPS:96/2001) **SBGENDER**

Male
Female

Primary language (BPS:96/2001) **SBLANG**

Student's response to the question "What language was spoken most often at home as you were growing up?"

English
Spanish, Catalan, Galician, Basque
Arabic
Bahasa
Chinese, Cantonese, Mandarin
Farcey (Pharsi)

DAS Variable

Primary language (BPS:96/2001)—Cont.

French and Canadian French
Gaelic
German
Hebrew
Hindi, Malay, Tamil
Japanese
Korean
Malaysian (Bahasa Malay)
Urdu, Punjabi, Sindi
Tagalog
Thai
Vietnamese
Welsh
American Sign Language or other Sign Language
Bengel
Dutch
Kurdish
Portuguese

Race/ethnicity (including Hispanic) (BPS:96/2001) **SBRACE**

See RACE2 for description.

NPSAS CATI weight 1999–2000 (NPSAS:2000) **WTB00**

Weight applied to items asked in the Computer Assisted Telephone Interview (CATI). The main variable used in the analysis (delayed enrollment) is based primarily on information from the student interview.

BPS longitudinal weight 1996/2001 (BPS:96/2001) **WTD00**

Weight for longitudinal analysis of students who responded in both NPSAS:96/2001 and BPS:1996/2001.

High school transcript panel weight (NELS:88/2000) **WTP00**

High school transcript weight for respondents who participated in the second, third, and fourth followups. This weight allows projections to the population of persons who were 12th-graders during the spring of 1992.

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix B—Technical Notes and Methodology

The 1999–2000 National Postsecondary Student Aid Study

The 1999–2000 National Postsecondary Student Aid Study (NPSAS:2000) is the latest in a series of comprehensive studies of all students enrolled in postsecondary education in the United States and Puerto Rico. The study is conducted by the U.S. Department of Education's National Center for Education Statistics (NCES) to determine how students and their families pay for postsecondary education.[1] It also describes demographic and other characteristics of students enrolled. The first NPSAS study was conducted in 1986–87 (NPSAS:87) and since then four additional studies have been conducted (NPSAS:90, NPSAS:93, NPSAS:96, and NPSAS:2000). The sixth administration (NPSAS:2004) is currently being conducted.

The institutional sampling frame for NPSAS:2000 was constructed from the 1998–99 Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics (IC) file and, because NPSAS:2000 also served as the base-year survey for a longitudinal study of baccalaureate recipients, the 1996–97 IPEDS Completions file. Eligible institutions were partitioned into 22 institutional strata based on institutional control, highest level of offering, and percentage of baccalaureate degrees awarded in education. Approximately 1,100 institutions were initially selected for NPSAS:2000, and all but 10 of these institutions were found to be eligible. Sampling frames for selecting students consisted of enrollment lists or data files provided by the institutions for those students enrolled during the NPSAS:2000 year, and at least 40 students were sampled from each institution. The study is based on a nationally representative sample of all students in postsecondary education institutions, including undergraduate, graduate, and first-professional students. Information was obtained from approximately 50,000 undergraduate, 10,600 graduate, and 1,200 first-professional students. They represented about 16.5 million undergraduates, 2.4 million graduate students, and 300,000 first-professional students who were enrolled at some time between July 1, 1999, and June 30, 2000.

Data were collected using computer-assisted telephone and in-person interviews (CATI and CAPI). Supplementary sources of data included the National Student Loan Data System

[1] For more information on the NPSAS survey, consult U.S. Department of Education, National Center for Education Statistics, *Methodology Report for the 1999–2000 National Postsecondary Student Aid Study* (NCES 2002–152) (Washington, DC: 2001). Additional information is also available at the NPSAS website http://nces.ed.gov/npsas.

(NSLDS), ACT database, SAT records from ETS, Central Processing System data, and data from institutions collected using a computer-assisted data entry (CADE) program. Data editing and imputations were conducted both during the interview and after data collection was complete. Range editing, item consistency, and other checks were made to ensure data quality, and logical imputation was performed where appropriate.

The institutional response rate was 91 percent, CATI response rate was 72 percent, and the weighted overall student interview response rate was 65.6 percent.[2] Because the student telephone interview response rate for NPSAS:2000 was less than 70 percent in some institutional sectors, an analysis was conducted to determine if computer assisted telephone interview (CATI) estimates were significantly biased due to CATI nonresponse. Considerable information was known for CATI nonrespondents, and these data were used to analyze and reduce the bias. The distributions of several variables using the design-based, adjusted weights for study respondents (study weights) were found to be biased before CATI nonresponse adjustments. The CATI nonresponse and poststratification procedures, however, reduced the bias for these variables, and the remaining relative bias ranged from 0 to 0.35 percent.[3] The weight used in this analysis is WTB00, the weight applied to all CATI respondents.

The National Education Longitudinal Study of 1988

The National Education Longitudinal Study of 1988 (NELS:88) began in 1988 with a nationally representative, two-stage stratified probability sample of 1,052 8th-grade schools across the nation and 26,432 sampled students in the schools.[4] Of the sampled students, 24,599 participated. Subsamples of this cohort were followed up in 1990, when most members were in 10th grade; in 1992, when most were in 12th grade; and in 1994 and 2000, when most of the cohort members had been out of high school for 2 and 8 years, respectively.[5] The study was designed not only to follow a cohort of 8th-grade students over time but also to "freshen" the sample in the 1990 and 1992 surveys to obtain a representative sample of students enrolled in 10th grade in 1990 and in 12th grade in 1992, which could be compared with the earlier cohorts from the National Longitudinal Study of the High School Class of 1972 (NLS:72) and the High School and Beyond Longitudinal Study (HS&B). The approximate sample sizes of the 1990 and 1992 followup surveys were 18,000 and 16,000, respectively. In late 1992, high school

[2] Ibid.
[3] For nonresponse bias analysis, see U.S. Department of Education, National Center for Education Statistics, *National Postsecondary Student Aid Study, 1999–2000 (NPSAS:2000), CATI Nonresponse Bias Analysis Report* (NCES 2002–03) (Washington, DC: 2002), available at http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=200203.
[4] For more information on NELS:88/2000, consult U.S. Department of Education, National Center for Education Statistics, *National Education Longitudinal Study of 1988: Base-Year to Fourth Follow-up Data File User's Manual* (NCES 2002–323) (Washington, DC: 2002).
[5] In order to meet budgetary constraints, students were subsampled in each follow-up.

transcripts were collected for sample members from students in 12th grade attending in spring of 1992, all dropouts, early graduates, and students who were ineligible for the three previous followups. The overall response rate was 94 percent.[6] The final followup was conducted in 2000 when sample members were about 26 years old. Data were collected for about 15,000 individuals subsampled from the third followup with a weighted response rate of about 83 percent.

Because the analysis of the NELS data in this report focuses on high school academic coursetaking, only students with high school transcripts were included in the analysis (i.e., the high school transcript weight was used—WTP00). The sample was further restricted to students who completed high school in the spring of 1992 (i.e., 1992 high school graduates) and who had enrolled in postsecondary education at any time up until the last followup in 2000. The date of postsecondary entry was used to determine postsecondary participation (F4EFMY) and also to determine if a student had delayed postsecondary enrollment.

Beginning Postsecondary Students Longitudinal Study

The Beginning Postsecondary Students (BPS) Longitudinal Study was first conducted in the 1989–90 academic year. The BPS:96/01 study was the second in the series of studies focusing on first-time beginning students (FTBs) in postsecondary education, and is composed of the students who participated in the 1995–96 National Postsecondary Student Aid Study (NPSAS:96). NPSAS:96 consisted of a nationally representative sample of students enrolled in all levels of postsecondary education during the 1995–96 academic year. Respondents were selected for inclusion in NPSAS:96 using a two-stage sampling design; the first stage involved selecting eligible institutions (derived from the 1993–94 Integrated Postsecondary Education Data System (IPEDS) Institutional Characteristics (IC) file), and the second stage was the selection of eligible respondents within each eligible institution. Approximately 9,500 institutions were identified in the IPEDS IC file. These eligible institutions were then partitioned into institutional strata based on level and control, and additional implicit stratification was done within each institution type by region and size. Sampling frames for selecting students consisted of enrollment lists or data files provided by the institutions for those students enrolled during the NPSAS:96 year, which yielded a total of 12,400 students eligible for the BPS:96 cohort. At least 40 students were sampled from each institution, where possible. The BPS sample consisted of approximately 12,400 students identified in NPSAS:96 who were beginning postsecondary education for the first time at some point in the 1995–96 academic year, and who were not concurrently enrolled in secondary education or a high school completion program. The First Follow-up of the BPS cohort (BPS:96/98) was conducted in 1998, approximately 3 years after

[6] Ingals, S. et al. *Second Follow-Up: Transcript Component Data File User's Manual* (NCES 95–399). U.S Department of Education, National Center for Education Statistics (Washington DC: 1995).

these students first enrolled. Approximately 10,300 of the students who first began in 1995–96 were located and interviewed in the 1998 follow-up, for an overall weighted response rate of 79.8 percent. This response rate includes those who were nonrespondents in 1996; among the NPSAS:96 respondents, the response rate was 85.9 percent.[7] The Second Follow-up of the BPS cohort (BPS:96/2001) was conducted in 2001, 6 years after students' college entry. All respondents to the First Follow-up, as well as a subsample of nonrespondents in 1998, were eligible to be interviewed, and after excluding respondents who were deceased by 2001, 12,100 cases were eligible for BPS:96/01. Over 9,100 of these students were located and interviewed, resulting in a weighted sample size of 2.8 million respondents. The weighted response rate was 76.1 percent overall, with an institutional response rate of 91.1 percent and student response rate of 83.6 percent.[8]

The BPS:96/01 interviews were conducted using computer-assisted interviewing technology to conduct both telephone (CATI) and in-person (CAPI) interviews. Data were also collected from the institutions in which the students were enrolled, the Central Processing System (CPS) database, and the National Student Loan Data System (NSLDS). The CATI and CAPI systems were programmed with range editing and consistency edits. There were also multiple post-interview data cleaning steps that were designed to ensure internal consistency within items and maintain skip-pattern relationships. Logical imputations were performed where appropriate, with the goal of maximizing the number of respondents to which each item applied.

Nonresponse among cohort members causes bias in survey estimates when the outcomes of respondents and nonrespondents are shown to be different. A bias analysis was conducted on the 2001 survey results to determine if any variables were significantly biased due to nonresponse.[9] Considerable information was known from the 1996 and 1998 surveys for nonrespondents to the 2001 interviews, and nonresponse bias could be estimated using variables with this known information. Weight adjustments were applied to the BPS:96/2001 sample to reduce any bias found due to unit nonresponse. After the weight adjustments, some variables were found to reflect zero bias, and for the remaining variables, the bias did not differ significantly from zero. All analyses in this report are weighted to compensate for unequal probability of selection into the BPS sample. The weight variable used in this report for analysis of the BPS:96/2001 data is WTD00, the longitudinal weight for students who responded in 1996 and in 2001.

[7] For more information on the BPS:96/98 survey, consult U.S. Department of Education, National Center for Education Statistics, *Beginning Postsecondary Students Longitudinal Study First Follow-up 1996–98, Methodology Report* (NCES 2000–157) (Washington, DC: 2000).
[8] For more information on the BPS:1996/2001 survey, consult U.S. Department of Education, National Center for Education Statistics, *Beginning Postsecondary Students Longitudinal Study:1996–2001 Methodology Report* (NCES 2002–171) (Washington, DC: 2002).
[9] Ibid.

Accuracy of Estimates

The statistics in this report are estimates derived from a sample. Two broad categories of error occur in such estimates: sampling and nonsampling errors. Sampling errors occur because observations are made only on samples of students, not entire populations. Nonsampling errors occur not only in sample surveys but also in complete censuses of entire populations. Nonsampling errors can be attributed to a number of sources: inability to obtain complete information about all students in all institutions in the sample (some students or institutions refused to participate, or students participated but answered only certain items); ambiguous definitions; differences in interpreting questions; inability or unwillingness to give correct information; mistakes in recording or coding data; and other errors of collecting, processing, sampling, and imputing missing data.

Item Response Rates

Weighted item response rates were calculated for the analysis samples for all variables used in this report. The weighted item response rates were calculated by dividing the weighted number of valid responses in each analysis sample by the weighted population for which the item was applicable. All of the items had response rates of 86 percent or higher. For these variables, it is unlikely that reported differences are biased because of missing data.

Data Analysis System

The series of studies conducted under the Postsecondary Education Descriptive Analysis Reports (PEDAR) contract with NCES require all analyses to be based on the Data Analysis System (DAS), a web-based software application that provides public access to the NCES postsecondary datasets. The DAS software makes it possible for users to specify and generate their own tables. With the DAS, users can replicate or expand upon the tables presented in this report. In addition to the table estimates, the DAS calculates proper standard errors[10] and weighted sample sizes for these estimates. For example, table B-1 contains standard errors that correspond to table 6, generated by the DAS. If the number of valid cases is too small to produce a reliable estimate (less than 30 cases), the DAS prints the message "low-N" instead of the estimate. All standard errors for estimates presented in this report can be viewed at http://nces.ed.gov/das/library/reports.asp.

[10] None of the survey samples were based on simple random sampling procedures and, therefore, simple random sample techniques for estimating sampling error cannot be applied to these data. The DAS takes into account the complexity of the sampling procedures and calculates standard errors appropriate for such samples. The method for computing sampling errors used by the DAS involves approximating the estimator by the linear terms of a Taylor series expansion. The procedure is typically referred to as the Taylor series method.

Table B-1. Standard errors for table 6: Percentage distributions of enrollment characteristics of 1995–96 beginning postsecondary students, by number of years between high school graduation and first postsecondary enrollment

Enrollment characteristics	U.S. total (excluding Puerto Rico)	Total (50 states, DC, and Puerto Rico)	No delay	Duration of delay				
				Any delay	1 year	2–4 years	5–9 years	10 or more years
Type of first institution								
Public 2-year	3.01	2.99	3.13	4.06	4.11	5.83	6.49	5.60
Public 4-year	1.88	1.90	2.50	1.37	2.33	2.49	1.75	1.81
Private not-for-profit 4-year	1.38	1.41	1.93	1.17	1.75	1.95	1.45	0.93
Private for-profit	2.45	2.39	0.77	4.22	3.13	4.54	6.04	5.25
Other	0.48	0.47	0.32	1.31	0.47	1.98	1.74	1.78
Degree program at first institution								
Certificate	2.18	2.13	0.79	4.12	4.08	4.83	6.70	5.14
Associate's degree (including transfer)	2.20	2.16	2.63	3.68	3.22	4.96	6.21	5.13
Bachelor's degree	2.30	2.31	2.82	1.86	3.21	3.56	2.16	1.57
Degree expected at first institution								
None	0.60	0.59	0.68	2.00	2.01	3.22	3.69	3.69
Certificate	1.87	1.83	0.74	3.37	3.43	4.67	4.88	4.41
Associate's degree	1.66	1.69	1.82	3.17	4.27	5.73	7.34	3.40
Bachelor's degree or transfer to 4-year insitution	2.02	2.03	1.69	1.97	4.26	3.89	3.13	2.27
Highest degree ever expected								
Don't know	0.57	0.57	0.66	1.27	2.97	2.80	3.54	2.24
Less than a bachelor's degree	1.38	1.38	0.58	3.01	2.54	3.99	5.23	4.80
Bachelor's degree	0.91	0.91	1.05	1.56	4.21	3.48	5.17	3.22
Advanced degree	1.75	1.75	1.26	2.17	4.11	5.32	4.62	2.00
Attendance intensity first year								
Exclusively full-time	1.64	1.65	1.61	3.38	6.11	4.23	6.64	4.72
Mixed full-time/part-time	1.15	1.14	1.29	1.41	3.59	2.26	3.22	2.72
Half-time	0.79	0.79	0.77	2.07	2.67	2.67	3.95	3.27
Less than half-time	0.98	0.97	0.54	2.70	2.72	3.39	3.27	4.61
Remedial coursetaking in first year								
Took courses	1.06	1.06	1.09	1.09	4.36	3.93	3.75	3.22

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).

In addition to tables, the DAS will also produce a correlation matrix of selected variables to be used for linear regression models. Included in the output with the correlation matrix are the design effects (DEFTs) for each variable in the matrix. Since statistical procedures generally

compute regression coefficients based on simple random sample assumptions, the standard errors must be adjusted with the design effects to take into account the stratified sampling method used in the surveys.

For more information about the Data Analysis Systems, consult the NCES DAS website (http://nces.ed.gov/das) or contact:

Aurora D'Amico
National Center for Education Statistics
1990 K Street NW
Room 8115
Washington, DC 20006
(202) 502-7334
E-mail: Aurora.D'Amico@ed.gov

Statistical Procedures

Differences Between Means

The descriptive comparisons were tested in this report using Student's *t* statistic. Differences between estimates are tested against the probability of a Type I error,[11] or significance level. The significance levels were determined by calculating the Student's *t* values for the differences between each pair of means or proportions and comparing these with published tables of significance levels for two-tailed hypothesis testing.

Student's *t* values may be computed to test the difference between estimates with the following formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2}} \quad (1)$$

where E_1 and E_2 are the estimates to be compared and se_1 and se_2 are their corresponding standard errors. This formula is valid only for independent estimates. When estimates are not independent, a covariance term must be added to the formula:

$$t = \frac{E_1 - E_2}{\sqrt{se_1^2 + se_2^2 - 2(r)se_1\, se_2}} \quad (2)$$

[11] A Type I error occurs when one concludes that a difference observed in a sample reflects a true difference in the population from which the sample was drawn, when no such true difference is present.

where *r* is the correlation between the two estimates.[12] This formula is used when comparing two percentages from a distribution that adds to 100. If the comparison is between the mean of a subgroup and the mean of the total group, the following formula is used:

$$t = \frac{E_{sub} - E_{tot}}{\sqrt{se_{sub}^2 + se_{tot}^2 - 2p \;\; se_{sub}^2}} \tag{3}$$

where *p* is the proportion of the total group contained in the subgroup.[13] The estimates, standard errors, and correlations can all be obtained from the DAS.

There are hazards in reporting statistical tests for each comparison. First, comparisons based on large *t* statistics may appear to merit special attention. This can be misleading since the magnitude of the *t* statistic is related not only to the observed differences in means or percentages but also to the number of respondents in the specific categories used for comparison. Hence, a small difference compared across a large number of respondents would produce a large *t* statistic.

A second hazard in reporting statistical tests is the possibility that one can report a "false positive" or Type I error. In the case of a *t* statistic, this false positive would result when a difference measured with a particular sample showed a statistically significant difference when there is no difference in the underlying population. Statistical tests are designed to control this type of error, denoted by alpha. The alpha level of .05 selected for findings in this report indicates that a difference of a certain magnitude or larger would be produced no more than one time out of twenty when there was no actual difference in the quantities in the underlying population. When hypotheses are tested that show *t* values at the .05 level or smaller, this finding is treated as rejecting the null hypothesis that there is no difference between the two quantities. Failing to reject the null hypothesis (i.e., finding no difference), however, does not necessarily imply that the values are the same or equivalent.

When significant results are detected that are not indicated by any hypothesis, or when a large number of comparisons in a table are tested, Type I errors should not be ignored. For example, in this analysis, comparisons were sometimes made among four categories of delayed entrants based on how long they waited to enroll in postsecondary education—1 year, 2–4 years, 5–9 years, and 10 or more years. The probability of a Type I error for these comparisons taken as a group is larger than the probability for a single comparison. When more than one comparison between groups of related characteristics are tested for statistical significance, one must apply a standard that assures a level of significance for all of those comparisons taken together. In this

[12] U.S. Department of Education, National Center for Education Statistics, *A Note from the Chief Statistician,* no. 2, 1993.
[13] Ibid.

analysis, the Fisher's protected *t*-test method (also called the "least significant difference" method) was used to protect against the inflation of the overall probability of a Type I error.[14] The method involves calculating the overall *F* ratio (computed as part of the linear trend test described below) and determining whether the *F* value is sufficiently large to reject the null hypothesis. When the value of the overall *F* exceeded the value at the .05 level, the comparison was considered significant.

Linear Trends

While many descriptive comparisons in this report were tested using Student's *t* statistics, some comparisons among categories of an ordered variable (i.e., categories of delayed enrollment) involved a test for a linear trend across all categories, rather than a series of tests between pairs of categories. In this report, when differences among percentages were examined relative to the ordered categories of delayed enrollment, Analysis of Variance (ANOVA) was used to test for a linear relationship between the two variables. To do this, ANOVA models included orthogonal linear contrasts corresponding to successive levels of the delayed enrollment categories (independent variable). The squares of the standard errors, the variance between the means, and the unweighted sample sizes were used to partition total sum of squares into within- and between-group sums of squares. These were used to create mean squares for the within- and between-group variance components and their corresponding *F* statistics, which were then compared with published values of *F* for a significance level of .05.[15] Significant values of both the overall *F* and the *F* associated with the linear contrast term were required as evidence of a linear relationship between the two variables. Means and balanced replicated standard errors were calculated by the DAS. Unweighted sample sizes are not available from the DAS and were provided by NCES.

Multivariate Commonality Analysis

There are many ways for members of the public and other researchers to make use of NCES results. The most popular way is to read the written reports. (Other ways include obtaining and analyzing public use and restricted use data files. These allow researchers to carry out and publish their own secondary analyses of NCES data.)

It is very important when reading NCES reports to remember that they are descriptive in nature. That is, they are limited to describing some aspect of the condition of education. These

[14] See Snedecor, G. and Cochran, W. *Statistical Methods* (Ames, IA: Iowa State University Press, 1980, p. 234); or Harris, R. *A Primer of Mulitivariate Statistics* (New York: Academic Press, 1975, p. 11).
[15] More information about ANOVA and significance testing using the *F* statistic can be found in any standard textbook on statistical methods in the social and behavioral sciences.

results are usefully viewed as suggesting various ideas to be further examined in light of other data, including state and local data, and in the context of the large research literature elaborating on the many factors predicting and contributing to educational achievement or to other outcome variables of interest.

However, some readers are tempted to make unwarranted causal inferences from simple cross tabulations. It is never the case that a simple cross tabulation of any variable with a measure of educational achievement is conclusive proof that differences in that variable are a cause of differential educational achievement or that differences in that variable explain any other outcome variable. The old adage that "correlation is not causation" is a wise precaution to keep in mind when considering the results of NCES reports. Experienced researchers are aware of the design limitations of many NCES data collections. They routinely formulate multiple hypotheses that take these limitations into account and readers of this volume are encouraged to do likewise. As part of the Institute of Education Sciences, NCES has a responsibility to try to discourage misleading inferences from the data presented and to educate the public on the genuine difficulty of making valid causal inferences in a field as complex as education. Our reports are carefully worded to achieve this end.

This focus on description, eschewing causal analysis, extends to multivariate analyses as well as bivariate ones. Some NCES reports go beyond presenting simple crosstabulations and present results from multiple regression equations that include many different independent ("predictor") variables. This can be useful to the reader, especially those without the time or training to access the data on their own. Because many of the independent variables included in descriptive reports are related to each other and to the outcome they are predicting, a multivariate approach can help users to understand their interrelation. For example, many of the independent variables included in this study are related, and to some extent, the patterns of differences displayed in the descriptive tables reflect a common variation. For instance, when examining degree attainment or persistence by delayed enrollment status, some of the observed relationship may be due to differences in other factors related to delaying enrollment (e.g., delayed entrants enroll in public 2-year institutions *and* attend part time at higher rates than immediate entrants). While it is possible to create three-variable tables, when the number of independent variables increases to four or more, the number of cases in individual cells of such a table often becomes too small to find significant differences simply because there are too few cases to achieve statistical significance. To make economical use of the many available independent variables in the same data display, other statistical methods must be used that can take multiple predictor variables into account simultaneously.

Multiple linear regression is often used for this purpose: to adjust for the common variation among a list of independent variables.[16] This approach is referred to as "commonality analysis,"[17] because it identifies lingering relationships after adjustment for "common" variation. This method is used simply to confirm statistically significant associations observed in the bivariate descriptive analysis while taking into account the interrelationships among the predictor variables.

Thus, this multiple regression approach is descriptive. Significant coefficients reported in the regression tables indicate that when the variable is deleted from (or added to) the set of independent variables, it results in a non-zero change in R-squared, which is the basis of the commonality analysis. In other words, a significant coefficient means that the independent variable has a relationship with the outcome variable that is unique, or distinct from its relationship with other independent variables in the model.

Multivariate description of this sort is distinct from either a modeling approach in which an analyst attempts to identify the smallest relevant set of causal or explanatory independent variables associated with the dependent variable or variables or an approach using one of the many varieties of structural equation modeling. In contrast, a multivariate descriptive or commonality approach provides a richer understanding of the data without needing to make any kind of causal assumptions, which is why descriptive multivariate commonality analysis is often employed in NCES statistical reports.

When should commonality analysis be employed? It should be used in statistical analysis reports when independent variables are correlated with both the outcome variable and with each other. This will allow the analyst to determine how much of the effect of one independent variable is due to the influence of other independent variables, since in a multiple regression procedure these effects are adjusted for. As discussed in the section "Data Analysis System" above, all analyses included in PEDAR reports must be based on the DAS, which is available to the public online (http://nces.ed.gov/DAS). Exclusively using the DAS in this way provides readers direct access to the findings and methods used in the report so that they may replicate or expand on the estimates presented. However, the DAS does not allow users access to the raw data, which limits the range of multivariate procedures that can be used. Specifically, the DAS produces correlation matrices, which can be used as input in standard statistical packages to produce least squares regression models. This means that logit or probit procedures, which are

[16] For more information about least squares regression, see Michael S. Lewis-Beck, *Applied Regression: An Introduction*, Vol. 22 (Beverly Hills, CA: Sage Publications, Inc., 1980); William D. Berry and Stanley Feldman, *Multiple Regression in Practice*, Vol. 50 (Beverly Hills, CA: Sage Publications, Inc., 1987).
[17] For more information about commonality analysis, see F. Kerlinger and E. Pedhauzer, *Multiple Regression in Behavioral Research* (Holt, Rinehart, and Winston Inc., 1973).

more appropriate for dichotomous dependent variables cannot be used.[18] However, empirical studies have shown that when the mean value of a dichotomous dependent variable falls between 0.25 and 0.75 (as it does in this analysis), regression and log-linear models are likely to produce similar results.[19]

The independent variables analyzed in this study and subsequently included in the multivariate model were chosen based largely on earlier empirical studies (cited in the text), which showed significant associations with the key analytic variable, delayed enrollment. Before conducting the study, a detailed analysis plan was reviewed by a Technical Review Panel (TRP) of experts in the field of higher education research and additional independent variables requested by the TRP were considered for inclusion. The analysis plan listed all the independent variables to be included in the study. The TRP also reviewed the preliminary results as well as the first draft of this report. The analysis plan and subsequent report were modified based on TRP comments and criticism.

Missing Data and Adjusting for Complex Sample Design

The DAS computes the correlation matrix using pairwise missing values. In regression analysis, there are several common approaches to the problem of missing data. The two simplest approaches are pairwise deletion of missing data and listwise deletion of missing data. In pairwise deletion, each correlation is calculated using all of the cases for the two relevant variables. For example, suppose you have a regression analysis that uses variables X1, X2, and X3. The regression is based on the correlation matrix between X1, X2, and X3. In pairwise deletion, the correlation between X1 and X2 is based on the nonmissing cases for X1 and X2. Cases missing on either X1 or X2 would be excluded from the calculation of the correlation. In listwise deletion, the correlation between X1 and X2 would be based on the nonmissing values for X1, X2, and X3. That is, all of the cases with missing data on any of the three variables would be excluded from the analysis.

The correlation matrix produced by the DAS can be used by most statistical software packages as the input data for least squares regression. The DAS provides either the SPSS or SAS code necessary to run least squares regression models. The DAS also provides additional information to incorporate the complex sample design into the statistical significance tests of the

[18] See John H. Aldrich and Forrest D. Nelson, "Linear Probability, Logit and Probit Models" (*Quantitative Applications in Social Sciences*, Vol. 45) (Beverly Hills, CA: Sage, 1984). Analysts who wish to estimate other types of models can apply for a restricted data license from NCES.

[19] See for example, Goodman, L.A., "The Relationship Between Modified and Usual Multiple-Regression Approaches to the Analysis of Dichotomous Variables"; pp. 83-110 in David Hoise ed., *Sociolgical Methodology* (San Francisco: Jossey-Bass, 1976), and Knoke, D. "A Comparison of Log-Linear and Regression Models for Systems of Dichotomous Variables" (*Sociological Methods and Research,* Vol. 3: Sage, 1975).

parameter estimates. Most statistical software packages assume simple random sampling when computing standard errors of parameter estimates. Because of the complex sampling design used for the survey, this assumption is incorrect. A better approximation of their standard errors is to multiply each standard error by the design effect associated with the dependent variable (DEFT),[20] where the DEFT is the ratio of the true standard error to the standard error computed under the assumption of simple random sampling. The DEFT is calculated by the DAS and displayed with the correlation matrix output.

Interpreting the Results

The least squares regression coefficients displayed in the regression tables in this report are expressed as percentages. Significant coefficients represent the observed differences that remain between the analysis group (such as those who delayed enrollment) and the comparison group (did not delay) after controlling for the relationships of all the selected independent variables. For example, in table 11, the least squares coefficient for those who delayed enrollment for one year is –6.80. This means that compared to those who did not delay enrollment, roughly 7 percent *fewer* of the group who delayed 1 year would be expected to attain a degree or be enrolled within 6 years of initial postsecondary enrollment, after controlling for the relationships among all the other independent variables.

[20] The adjustment procedure and its limitations are described in C.J. Skinner, D. Holt, and T.M.F. Smith, eds., *Analysis of Complex Surveys* (New York: John Wiley & Sons, 1989).

THIS PAGE INTENTIONALLY LEFT BLANK

Appendix C—Supplemental Table

THIS PAGE INTENTIONALLY LEFT BLANK

Table C-1. Percentage distributions among 1995–96 beginning postsecondary students who delayed enrollment 1 or more years, by selected student and enrollment characteristics

Selected student and enrollment characteristics	No delay	Duration of delay				
		Any delay	1 year	2–4 years	5–9 years	10 or more years
Total (excluding Puerto Rico)	65.4	34.6	8.8	7.6	6.5	11.7
Total (50 states, DC, and Puerto Rico)	65.7	34.3	8.7	7.6	6.5	11.5
Gender						
Male	67.6	32.4	8.9	8.6	6.3	8.6
Female	64.2	35.8	8.5	6.8	6.6	14.0
Race/ethnicity[1]						
American Indian	46.1	53.9	11.2	18.2	7.6	16.9
Asian/Pacific Islander	73.4	26.6	6.8	5.0	6.8	8.0
Black	57.3	42.7	12.5	11.0	8.9	10.3
Hispanic	67.1	32.9	12.2	7.9	5.3	7.6
White	66.7	33.3	7.6	6.9	6.3	12.6
Income level in 1994						
Bottom 25 percent	61.0	39.0	14.0	11.1	6.4	7.4
Middle 50 percent	64.6	35.4	7.6	7.6	8.3	12.0
Top 25 percent	73.8	26.2	5.1	3.5	2.2	15.5
Parents' highest education level						
High school diploma or less	49.4	50.6	8.8	10.5	8.7	22.6
Some postsecondary education	71.3	28.7	10.7	7.0	7.2	3.8
Bachelor's degree or higher	82.7	17.3	7.6	4.6	3.0	2.2
Dependency and marital status						
Dependent	85.8	14.2	8.6	5.2	0.4	0.0
Independent, no dependents, unmarried	7.9	92.1	3.7	18.0	35.7	34.7
Independent, no dependents, married	9.3	90.7	8.6	8.6	15.2	58.3
Independent with dependents	9.6	90.4	10.9	14.5	21.3	43.7
Primary language						
English	66.7	33.3	8.1	7.4	6.5	11.2
Not English	57.9	42.1	15.3	10.2	6.9	9.8
Type of first institution						
Public 2-year	56.9	43.1	10.1	8.1	9.0	15.9
Public 4-year	83.9	16.1	7.3	4.4	1.8	2.7
Private not-for-profit 4-year	87.7	12.4	5.3	3.2	1.3	2.6
Private for-profit	32.0	68.0	10.9	18.2	14.6	24.3
Other [2]	29.7	70.3	10.7	17.9	9.8	31.8

See notes at end of table.

Table C-1. Percentage distributions among 1995–96 beginning postsecondary students who delayed enrollment 1 or more years, by selected student and enrollment characteristics—Continued

Selected student and education characteristics	No delay	Duration of delay				
		Any delay	1 year	2–4 years	5–9 years	10 or more years
Attendance intensity first year						
Exclusively full-time	76.2	23.8	7.3	6.7	3.7	6.0
Mixed full-time/part-time	65.7	34.3	11.8	8.0	5.9	8.6
Part-time only	33.4	66.6	10.3	10.1	15.5	30.7
Degree expected at first institution						
None	50.3	49.7	10.1	9.0	8.5	22.3
Associate's or certificate	47.4	52.6	9.4	12.2	11.6	19.5
Bachelor's degree or transfer to 4-year insitution	83.2	16.8	7.5	3.9	2.3	3.0
Highest degree ever expected						
Less than a bachelor's degree	29.3	70.8	8.4	11.4	12.9	38.0
Bachelor's degree or higher	74.0	26.0	8.6	6.8	4.8	5.7
Remedial coursetaking in first year						
Did not take courses	65.5	34.5	9.0	7.6	6.4	11.5
Took courses	67.3	32.7	7.2	9.0	7.3	9.3
Attainment or level of enrollment 2001						
Attained or still enrolled	72.4	27.6	7.8	6.7	4.8	8.3
Never attained, not enrolled	52.6	47.4	10.5	9.3	9.8	17.8

NOTE: Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1996/01 Beginning Postsecondary Students Longitudinal Study (BPS:96/01).