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On Track to Complete?

A Taxonomy of Beginning Community College Students and Their Outcomes 3 Years After Enrolling: 2003–04 Through 2006

Statistical Analysis Report

NCES 2009-152

U.S. DEPARTMENT OF EDUCATION

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A Taxonomy of Beginning Community College Students and Their Outcomes 3 Years After Enrolling: 2003–04 Through 2006

Statistical Analysis Report

JULY 2009

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Executive Summary

Community colleges comprise the largest single sector of American postsecondary education, enrolling more than 40 percent of all undergraduates (Horn and Nevill 2006; Phillippe and Sullivan 2005). Pressure on community colleges to provide postsecondary education to a demographically diverse and marginally prepared segment of the U.S. population is growing (Bailey and Morest 2006). At the same time, community colleges are being called on to match their long-standing commitment to open access with equal commitment to completion (The National Commission on Community Colleges 2008). Roughly half of community college students complete a credential or transfer to a 4-year college after 6 years. In contrast, nearly two-thirds of students who begin in a 4-year institution complete a bachelor's degree in the same time period (Berkner, He, and Cataldi 2002).

Not all community college students intend to complete a formal program of study, however. If this is the case, how should community college students' intentions be characterized? This report proposes a classification scheme to address this question. The Community College Taxonomy (CCT) groups community college students according to how "directed" they are toward completing a program of study (strongly, moderately, or not directed) based on factors in their first year of enrollment. The factors are associated with completion and persistence, including students' intentions (reasons for enrolling), attendance intensity (half time or more), and program of study (4-year transfer, associate's degree, certificate, or none).

The purpose of the study is to examine the 3-year outcomes of the most recent national cohort of first-time community college students, and to investigate the relationship between these outcomes and the CCT. Neither the CCT nor the methods used to analyze this relationship are meant to imply causality. Specifically, the descriptive survey data used in the study and the types of analyses conducted (*t*-tests and logistic regressions involving descriptive cross-sectional and longitudinal data) cannot support causal claims. In the analyses, unmeasured factors may underlie the associations between variables included in the study, and there may be more complex interactions among variables that are not examined in this report. Finally, the data do not provide the specific reasons underlying students' intentions or their enrollment behaviors, which form the basis of the CCT.

Data and Methods

The study is based on data from the 2004/06 Beginning Postsecondary Students Longitudinal Study (BPS:04/06), which collected information from a sample of about 19,000 undergraduates who enrolled in about 1,300 postsecondary institutions for the first time between July 1, 2003, and June 30, 2004. All eligible BPS students were included in the survey even if they were no longer enrolled at the time of the first interview. Students were interviewed twice, first in 2004 as part of the National Postsecondary Student Aid Study (NPSAS:04), and second approximately 3 years after their first enrollment in spring 2006. Of the 18,640 eligible sample students, 14,900 responded, resulting in an unweighted response rate of 80 percent and a weighted response rate of 77 percent.[1] For the current analysis, only students who initially enrolled in a community college and were not enrolled concurrently in any other institution are included. About 5,800 undergraduates met the criteria for inclusion in the study.

The estimates presented in this report were produced using the BPS:04/06 Data Analysis System (DAS). All differences noted are statistically significant at the $p < .05$ level using Student's t statistic. In addition, logistic regressions were used to take into account the covariation of related variables. Logistic regression findings are presented in the main report. For more information on the DAS and statistical methods, see appendix B. The findings presented here are entirely descriptive. Although associations are noted and discussed, readers should not infer any causal relationships.

Community College Taxonomy

The CCT classifies first-time college students according to how strongly directed they are toward completing a program of study based on factors associated with persistence and degree attainment. Three levels of direction are defined: strongly, moderately, and not directed. Within the two directed groups, students are divided into their respective programs of study (4-year transfer, associate's degree,[2] or vocational certificate), which for simplicity are called "tracks." If students reported intentions to complete multiple programs, they were assigned to a track in the following order: 4-year transfer, associate's degree (AA), and certificate.

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[1] Since these rates are less than 85 percent, a nonresponse bias analysis was conducted (see appendix B for detail on bias analysis).

[2] Includes both Associate of Art (AA) and Associate of Science (AS) degrees. For simplicity, the acronym AA is used to refer to both degrees.

To be classified as *strongly directed,* students met the following three criteria:

- reported intentions to complete a program of study (4-year transfer, AA degree, or vocational certificate) as a purpose for enrolling in the community college;
- attended at least half time during their enrollment in their first year (2003–04);[3] and
- were enrolled in a formal degree program if identified as a degree seeker (AA degree or vocational certificate) with no initial 4-year transfer intentions.

Students who did not meet these criteria were designated as *moderately directed* if they met one of two criteria, regardless of their attendance status:

- reported intentions to complete a program (degree, certificate, or 4-year transfer); OR
- were enrolled in a formal AA or certificate program.

All others were designated as *not directed*. These students neither reported intentions to complete a program of study, nor were they enrolled in a degree or certificate program.

It should be kept in mind that, although the three CCT classifications are labeled "strongly directed," "moderately directed," and "not directed," the CCT is based on self-reported information regarding degree program enrollment and intentions for degree or certificate completion; it does not address the goals, motivations, or situational conditions that may underlie these behaviors and intentions at any given point in time, or across time. Research has shown that self-reported data are not as reliable as administrative data (Adelman 1999).

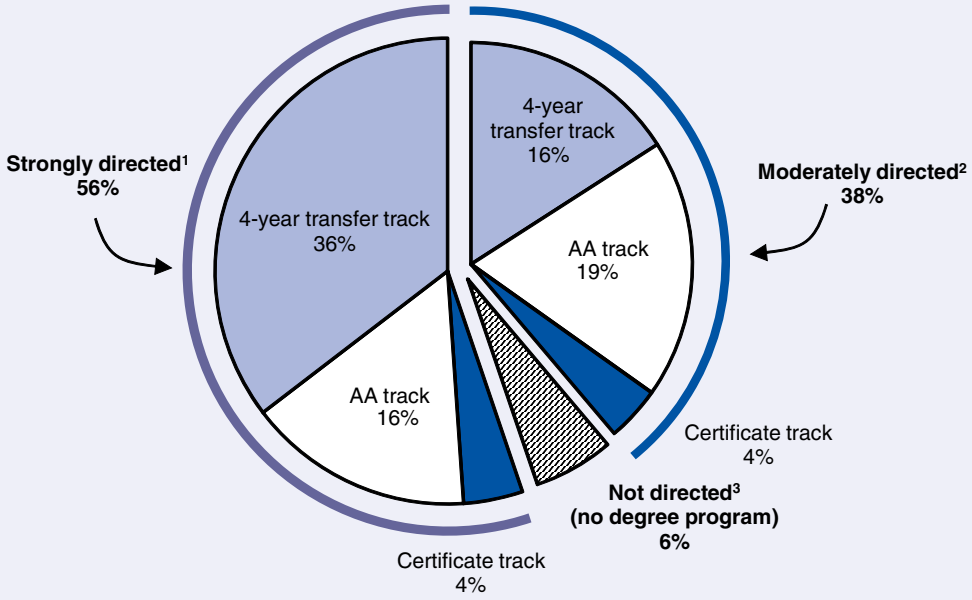
Classifying students within the CCT is not meant to imply that students who do not fit the profile of being strongly directed are less committed to their studies than those who do. Many students may be goal oriented but are hampered in making progress toward their goals in ways not captured in the BPS survey. For example, some students may be expected to contribute to their family's income and work full time to meet these obligations. Full-time employment may limit college attendance to less than half time or preclude students from enrolling in formal programs of study. Moreover, previous research based on data from an earlier BPS cohort indicate that

[3] Regardless of how long they were enrolled.

students may change their goals over time, with roughly equal proportions lowering or raising their expectations (Bailey, Leinbach, and Jenkins 2006).

With these limitations in mind, figure A displays the distribution of first-time community college students within the CCT. Some 56 percent were classified as strongly directed, the majority of whom were in the 4-year transfer track; another 38 percent were classified as moderately directed, 16 percent in the 4-year transfer track and 19 percent in the AA track; the remaining 6 percent were classified as not directed. Whether classified as strongly directed or moderately directed, a relatively small percentage (4 percent) of beginning community college students were in the certificate track.

Figure A. Percentage distribution of 2003–04 beginning community college students, by Community College Taxonomy: 2006



[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet "strongly directed" criteria, but enrolled in a formal degree/certificate program or reported intentions to complete a credential or 4-year transfer.

[3] Not enrolled in formal degree/certificate program and did not report intentions to complete a credential or 4-year transfer.

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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Student Characteristics and the Community College Taxonomy

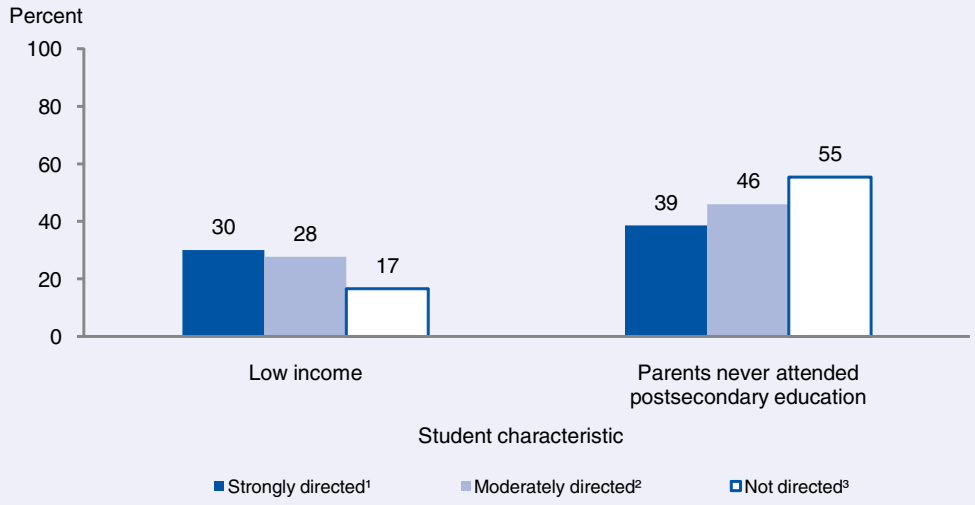
As was found in the earlier study using the CCT (Horn and Nevill 2006), age varied with students' CCT classification. The average age of the strongly directed group was

22 years, compared with 26 and 31 years for those in the moderately directed and not directed groups.

No statistically significant gender differences were evident across CCT classifications, and only one difference by race/ethnicity was statistically significant. Among the small percentage of students in the certificate track, a higher percentage of Hispanic students comprised the moderately directed track than the strongly directed certificate track (25 vs. 8 percent).

Differences by income and parents' education levels within the CCT indicated that strongly directed students were more likely than students classified as not directed, to be low income but less likely to be from families in which neither parent had achieved any postsecondary education (figure B).[4]

Figure B. Percentage of 2003–04 beginning community college students who were low income or whose parents never attended postsecondary education, by Community College Taxonomy: 2006



[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet "strongly directed" criteria, but enrolled in a formal degree/certificate program or reported intentions to complete a credential or 4-year transfer.

[3] Not enrolled in formal degree/certificate program and did not report intentions to complete a credential or 4-year transfer.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

[4] "Low-income" is defined as incomes in the lowest 25 percent. For dependent students (those typically under age 24), income level is based on parents' income, while for independent students, it is based on their own income. Income percentiles are determined separately for dependent and independent students. See glossary entry for INCGRP for more details.

In addition to demographic differences, students classified as strongly directed appeared to be better prepared academically than their peers classified as moderately directed or not directed, as measured by the highest mathematics course they reported taking in high school. A higher percentage of students designated as strongly directed completed mathematics courses beyond algebra 2 than moderately directed students (38 vs. 31 percent).[5]

Enrollment Status After 3 Years

Enrollment status is examined from both an institutional perspective (institutional retention rate) and from a student perspective (systemwide persistence rate). Institutional retention is defined as the percentage of students who complete a program or maintain enrollment at their first institution, while persistence is the percentage of students who complete a program or maintain their enrollment at *any* postsecondary institution. Students who transfer laterally (e.g., to another community college) before completing a program are not considered retained, but they have persisted in postsecondary education. Thus, by definition, the persistence rate is higher than the institutional retention rate.

Institutional Retention

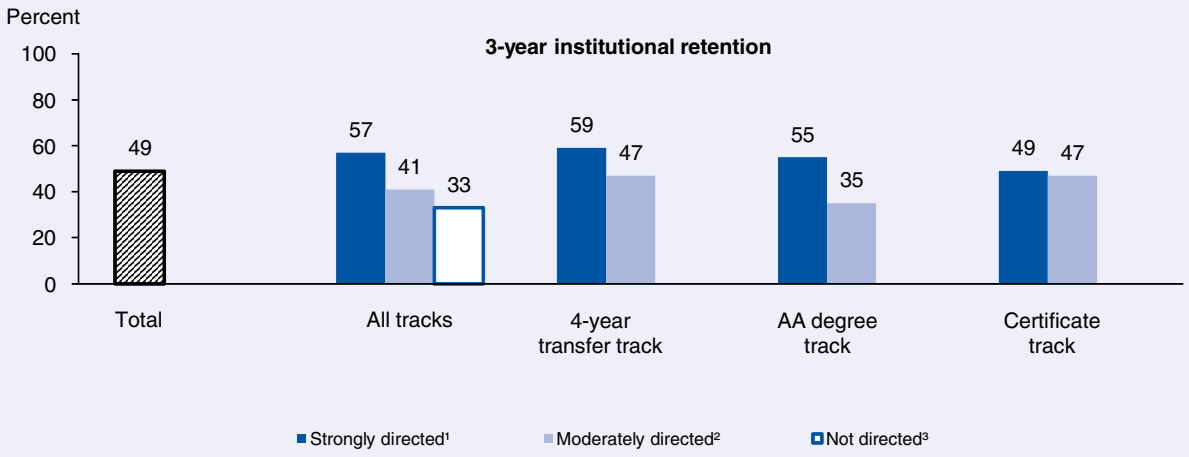
Three years after they first enrolled, roughly one-half (49 percent) of all first-time community college students had been retained, meaning they had completed a credential at their first institution, had transferred to a 4-year institution, or were still enrolled (figure C). From the perspective of the CCT, a majority (57 percent) of students designated as strongly directed had been retained. In contrast, 41 percent of moderately directed students and 33 percent of those designated as not directed were retained. Retention differences between strongly and moderately directed students were also observed for students in the 4-year transfer track (59 vs. 47 percent) and AA track (55 vs. 35 percent). For the small percentage of students in the certificate track, no differences were evident between strongly and moderately directed students (49 vs. 47 percent).

Student Persistence

Some 55 percent of all first-time community college students were either still enrolled in a postsecondary institution after 3 years or had completed a program of

[5] Highest mathematics course taken in high school was only reported by students under age 24, so this comparison excludes students age 24 or older.

Figure C. Percentage of 2003–04 beginning community college students who were still enrolled or had attained a degree or certificate from first institution or transferred to a 4-year institution within 3 years of enrollment (institutional retention), by Community College Taxonomy: 2006



[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet "strongly directed" criteria, but enrolled in a formal degree/certificate program or reported intentions to complete a credential or 4-year transfer.

[3] Not enrolled in formal degree/certificate program and did not report intentions to complete a credential or 4-year transfer.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

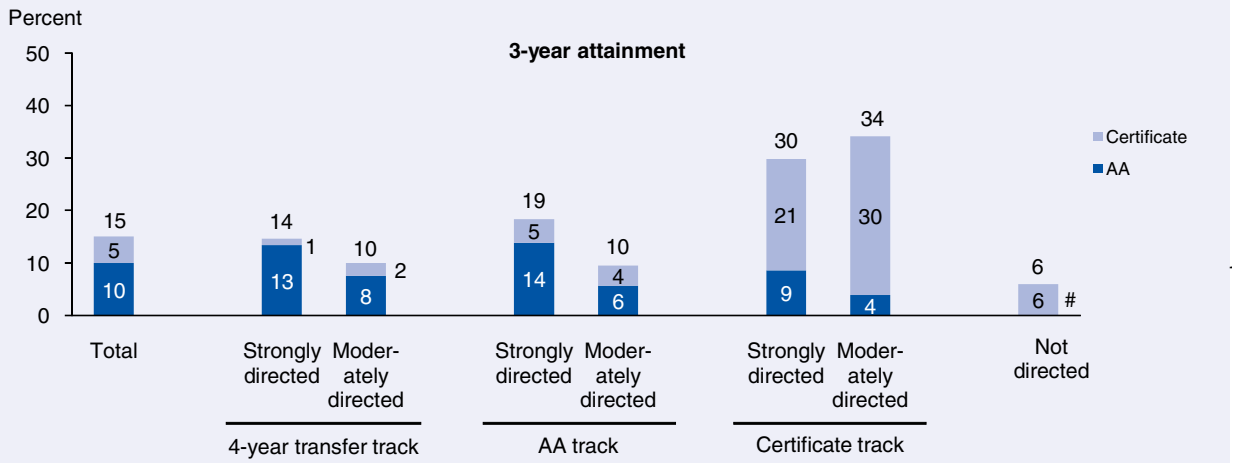
study. Like retention, persistence was higher for strongly directed students than for moderately directed students overall (62 vs. 48 percent) and within the AA track (58 vs. 43 percent) and 4-year transfer track (64 vs. 53 percent), but not within the certificate track (54 vs. 52 percent).

Degree and Certificate Attainment

By 2006, about 3 years after first-time students began their community college enrollment, some 10 percent had attained the degree (figure D). AA degree attainment rates were higher for strongly directed than for moderately directed students in both the 4-year transfer track (13 percent vs. 8 percent) and the AA degree track (14 percent vs. 6 percent).

Certificate completion generally takes a shorter amount of time than AA completion, with many programs designed to take a year or less (Grubb 1997). A total of 5 percent of all community college students had completed a certificate, but 21 percent of those in the strongly directed certificate track and 30 percent in the moderately directed certificate track had done so. While it appears as though students designated

Figure D. Percentage of 2003–04 beginning community college students who had attained an AA degree or certificate within 3 years of enrollment, by Community College Taxonomy: 2006



Rounds to zero.

NOTE: "Strongly directed" students reported intentions to complete program, enrolled in a formal degree program in first term (if AA or certificate track), and attended at least half time in first year. "Moderately directed" students did not meet "strongly directed" criteria, but enrolled in a formal degree/certificate program or reported intentions to complete a credential or 4-year transfer. "Not directed" students were not enrolled in a formal degree/certificate program and did not report intentions to complete a credential or 4-year transfer. Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

as moderately directed completed at a higher rate than strongly directed certificate students, due in part to small samples sizes, the difference is not statistically significant.

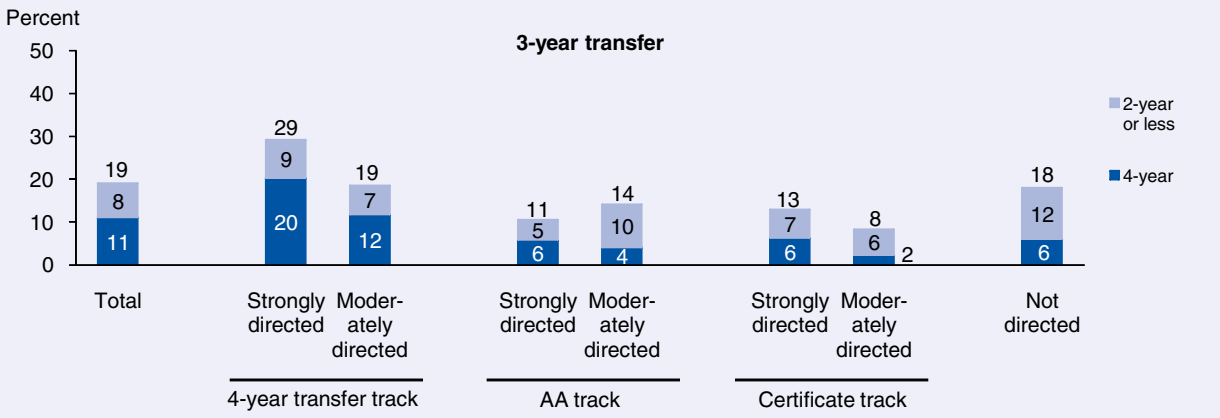
Transfer

In total, 19 percent of community college students had transferred from their initial institution within 3 years of enrolling: 11 percent to a 4-year college or university and 8 percent to another 2-year institution (figure E).[6] The strongly directed 4-year transfer students moved to 4-year institutions at a higher rate than their moderately directed peers (20 percent vs. 12 percent). However, an additional 9 percent, or nearly one-third, of strongly directed 4-year transfer students moved to another 2-year or less-than 2-year institution.

Transfer also occurred among students in AA and certificate tracks. For example, 11 percent of strongly directed AA students and 13 percent of strongly directed certificate track students transferred, and among the transfers in both these groups, roughly half ended up at 4-year institutions and the other half in sub-baccalaureate institutions.

[6] Less than 1 percent transferred to a less-than-2-year institution.

Figure E. Percentage of 2003–04 beginning community college students who had transferred within 3 years of enrollment, by Community College Taxonomy and level of transfer institution: 2006



NOTE: "Strongly directed" students reported intentions to complete program, enrolled in a formal degree program in first term (if AA or certificate track), and attended at least half time in first year. "Moderately directed" students did not meet "strongly directed" criteria, but enrolled in a formal degree/certificate program or reported intentions to complete a credential or 4-year transfer. "Not directed" students were not enrolled in a formal degree/certificate program and did not report intentions to complete a credential or 4-year transfer. Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Among students classified as not directed, some 18 percent had also transferred, 6 percent to 4-year institutions and 12 percent to sub-baccalaureate institutions.

Enrollment Continuity

Enrollment continuity is strongly associated with community college student outcomes (Adelman 2005). In this study, 39 percent of community college students were still enrolled after 3 years but had not attained a degree or credential. Yet not all of these students had been continuously enrolled over the 3-year period of study. In fact, among students still enrolled without a degree, 35 percent had stopped out, meaning they took a break of 5 or more months (i.e., longer than a natural summer break) between enrollments.[7] The rate of stopping out varied among CCT classifications, but unlike retention, where differences occurred between strongly and moderately directed students, statistically significant differences in stopping out were found between the group classified as not directed and the two directed groups (58 percent vs. 32 and 37 percent for strongly and moderately directed groups, respectively).

[7] Thirty-three percent had stopped out once and 2 percent had stopped out more than once.

Year-to-Year Attrition

Past research has shown that attrition from community colleges tends to be highest in the first year and then subsequently declines (e.g., Bradburn 2002). Similar results were observed in this study: 23 percent left in their first year, compared with 14 and 8 percent who left in their second or third year.[8] However, strongly directed students left in their first year at a lower rate (16 percent) than their moderately directed counterparts (29 percent), who in turn left at a lower rate than those classified as not directed (41 percent). In the second year, after their high attrition in the first year relative to strongly and moderately directed students, attrition rates were lower for students classified as not directed, compared with the other two groups (9 percent vs. 13 and 15 percent); by the third year, no differences in attrition rates were detected among the three groups (8, 7, and 6 percent, respectively, for strongly, moderately, and not directed students).

Conclusions

Three years after enrolling in a community college, 49 percent of beginning postsecondary students had maintained their enrollment or completed a program of study at their first institution, and 55 percent had persisted in any postsecondary institution. Some 10 percent of beginning community college students had earned an AA degree, 5 percent had completed a vocational certificate, and nearly 20 percent had transferred to another institution—11 percent to a 4-year college and 8 percent to another sub-baccalaureate institution. Nearly one-fourth (23 percent) had left in their first year and had not returned within the 3-year study period.

In terms of the CCT, students classified as strongly directed toward completion demonstrated higher rates of institutional retention, student persistence, AA degree attainment, and 4-year transfer than did their less directed counterparts. This was observed both overall and separately for students in the 4-year transfer and AA degree tracks, but not for students within the certificate track. For students who did not meet the criteria for being classified as strongly directed, moderately directed students demonstrated stronger enrollment continuity than did their peers classified as not directed.

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[8] First-year leavers are students whose last enrollment was in 2003–04 and who never enrolled again in subsequent years (2004–05 and 2005–06). Likewise, second-year leavers are those whose last enrollment was in 2004–05; third-year leavers are those whose last enrollment was in fall 2005, but who were not enrolled as of spring 2006.

Foreword

This report uses a classification scheme called the Community College Taxonomy (CCT) to group students according to how strongly directed they are to completing a program of study. Students' longitudinal outcomes after 3 years of enrollment, including institutional retention, student persistence, 4-year transfer rates, enrollment continuity, and first-year attrition are then examined in relation to their classification within the CCT. The analysis uses data from the 2004/06 Beginning Postsecondary Students Longitudinal Study (BPS:04/06). The BPS survey is the longitudinal component of the 2003–04 National Postsecondary Student Aid Study (NPSAS:04), a nationally representative sample that includes students enrolled in all types of postsecondary institutions. The BPS:04/06 cohort consists of students in the NPSAS:04 sample who were identified as having enrolled in postsecondary education for the first time during the 2003–04 academic year. The analysis sample used in the study comprises all students who started their postsecondary enrollment in public 2-year institutions (also known as community colleges) and who were not concurrently enrolled in another institution.

The estimates presented in the report were produced using the NCES Data Analysis System (DAS), a web-based software application that enables users to specify and generate tables for most of the postsecondary surveys conducted by NCES. The DAS produces the design-adjusted standard errors necessary for testing the statistical significance of differences in the estimates. The DAS for BPS:04/06 is available on the NCES website (http://nces.ed.gov/das). For more information on the DAS, see appendix B of this report.

Acknowledgments

The authors gratefully acknowledge Clifford Adelman of the Institute for Higher Education Policy and Davis Jenkins of the Community College Research Center for their helpful comments on an early draft of this report.

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Introduction

Some 7.6 million students or more than 40 percent of all undergraduates are enrolled in community colleges (Horn and Nevill 2006; Phillippe and Sullivan 2005). Community colleges have a long-standing open access policy, providing educational opportunities to the least well-prepared and those least sure of their intentions (Grubb 1996). The system provides educational opportunities to historically underserved populations such as students from low-income families, older students, and those who are the first in their family to attend college (Cohen and Brawer 2003). Many community colleges accommodate a range of students from older adults seeking the most basic levels of developmental or remedial education to dual-enrolled high school students seeking to complete college credits before high school graduation (Morest 2006).

Pressure on community colleges to provide postsecondary education to a demographically diverse and marginally prepared segment of the U.S. population is growing (Bailey and Morest 2006). At the same time, community colleges are being compelled to match their commitment to open access with equal emphasis on completion (The National Commission on Community Colleges 2008). Roughly half of community college students complete a credential or transfer to a 4-year college after 6 years. In contrast, 63 percent of students who begin in a 4-year institution complete a bachelor's degree in 6 years (Berkner, He, and Cataldi 2002).

Yet not all community college students intend to complete a formal program of study. If this is the case, how should community college students' intentions be characterized? A previous NCES report addressed this issue by developing a taxonomy that classified community college students by their relative commitment to completing a program of study (Horn and Nevill 2006). The Community College Taxonomy (CCT) was developed using findings from Adelman (2005) who analyzed data from the postsecondary transcripts of 1992 high school graduates to develop "portraits" of populations who attend community colleges. These portraits were based on the number of college credits earned by traditional-age students in various degree programs over an 8-year period. The portraits identified groups of students who were likely to persist and complete a degree and those who were likely to be less successful. The CCT drew on Adelman's model to illuminate the educational tracks of all students enrolled in community colleges in 2003–04 using data from the National Postsecondary Student Aid Study (NPSAS). While Adelman's model focused only on traditional college-age students using 8 years of transcript data, the

NPSAS study encompassed all community college students and was limited to information collected for 1 academic year.

The results from Horn and Nevill (2006) based on NPSAS data indicated that students who voiced clear intentions to complete a program of study and who took at least two classes per term were very likely to maintain continuous enrollment for at least 8 months. These students however, represented roughly half of all those enrolled in community colleges. Of those remaining, a majority reported reasons for enrolling other than completing a program. The two types of reasons cited most often were enrollment for personal enrichment and the need to obtain or enhance job skills.

Because NPSAS is a 1-year cross-sectional survey, it was not possible to determine the subsequent educational progress or outcomes of these students. However, a subset of students in the NPSAS survey, which form a cohort of first-time college students in 2003–04, is being followed over time. The current study used data from this survey, called the Beginning Postsecondary Students Longitudinal Study (BPS), to determine how well the CCT was related to student outcomes 3 years after enrolling. Unlike Adelman's 2005 study, which was based only on high school seniors, BPS represents all first-time community college students, regardless of age. For example, roughly one-third of BPS students enrolled in community colleges are 18 or younger, and nearly 20 percent are 30 or older; the average age is 24.

In addition to presenting detailed findings from the BPS cohort in terms of 3-year outcomes, the study addresses the following questions with respect to the Community College Taxonomy:

- How does the CCT vary with student characteristics and high school academic preparation measures?
- How well does the CCT relate to outcomes 3 years after students first enroll in a community college?

Report Organization

The report begins by describing the data and methods used in the analysis and detailing how students are classified within the CCT. It then examines students' CCT classification in relation to their demographic and socioeconomic characteristics, academic preparation indicators, financial aid receipt, and employment status. The subsequent sections examine in detail 3-year outcomes, including institutional retention, student persistence, degree attainment, transfer

rates, continuity of enrollment, and year-by-year attrition. The study also includes logistic regression analyses of retention, first-year attrition, and continuity of enrollment to control for factors related both to the CCT classifications and to student outcomes. The final section summarizes the results and concludes the study.

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Data and Methods

The analysis is based on data from the 2004/06 Beginning Postsecondary Students Longitudinal Study (BPS:04/06), which collected information from a sample of about 19,000 undergraduates who enrolled in about 1,300 postsecondary institutions for the first time between July 1, 2003, and June 30, 2004. These students were interviewed in 2004 as part of the National Postsecondary Student Aid Study (NPSAS:04) and were interviewed again approximately 3 years later (as of spring 2006). All eligible BPS students were included in the survey even if they were no longer enrolled when they were first interviewed in 2004. Of the 18,640 eligible sample students, 14,900 responded, resulting in an unweighted response rate of 80 percent and a weighted response rate of 77 percent. Since these rates are less than 85 percent, a nonresponse bias analysis was conducted (see appendix B for detail on the bias analysis).

For the current analysis, only students who initially enrolled in a community college and were not enrolled concurrently in any other institution are included. About 5,800 undergraduates met the criteria for inclusion in the study.

Two other BPS cohorts have been studied (BPS:89/94 and BPS:96/01), but neither cohort had a large enough sample of community college students to allow as detailed an analysis as that presented in this study. Moreover, unlike the previous BPS surveys, students in the newest survey were given the opportunity to report multiple reasons why they enrolled in a community college instead of one "primary reason." As a result, students in occupation-oriented programs, who might report obtaining job skills as their primary reason for enrolling, could also report whether they intended to earn a credential or to transfer. These completion intentions are a critical component of the CCT.

The estimates presented in this report were produced using the BPS:04/06 Data Analysis System (DAS). Standard *t* tests determined the statistical significance of differences noted in the report. All differences are statistically significant at the $p < .05$ level. In addition, logistic regressions were used to take into account the covariation of related variables. For more information on the DAS and statistical methods, see appendix B. The findings presented here are entirely descriptive. Although associations are noted and discussed, readers should not infer any causal relationships. In particular, neither the descriptive survey data nor the types of analyses conducted, including *t*-tests and logistic regressions involving descriptive cross-sectional and longitudinal data, can support causal claims. In both the bivariate

analyses and in the logistic regressions, unmeasured factors may underlie the associations between variables included in the study and there may be more complex interactions among variables that are not examined in this report.

Community College Taxonomy

The Community College Taxonomy is defined by three attributes known to be associated with degree attainment and persistence: student intent to complete or transfer to a 4-year institution, attendance intensity, and enrollment in a formal program of study for degree seekers. As stated by Tinto in his seminal review of research on college attrition: "… individual intentions regarding participation in higher education and attendance at a specific institution are important predictors in the likelihood of degree completion" (Tinto 1993, p 38).

A large body of research also has shown that students who attend college full time are much more likely to complete a degree (e.g., Berkner, He, and Cataldi 2002; Chen 2007). Many of these studies, however, focus on 4-year college students, most of whom attend full time, whereas a majority of community college students attend part time (Horn and Nevill 2006). Setting the attendance criterion too strictly would result in losing many students who might be strongly committed to finishing a course of study but because of family, work, or other responsibilities are only able to attend part time. Therefore, for this study, attending at least half time in the first year of enrollment, which corresponds to taking at least two classes per term in the first year, was deemed adequate for demonstrating direction toward completing a credential or transferring. This attendance level is analogous to Adelman's requirement that students complete at least 10 credits in order to be included in the degree attainment and transfer rates (Adelman 2005). Absent transcripts, which are not available in the BPS study, half-time attendance intensity serves as a means of distinguishing degree or transfer-seeking students from those Adelman refers to as "incidental" students.

The third attribute, enrollment in a formal degree program, is required to earn a degree or certificate in a community college. It is not always required to transfer to a 4-year institution, so the criterion was only required of students with AA or certificate intentions who did not also report transfer to a 4-year college as a purpose for enrolling.

Based on these three attributes, the CCT classifies students according to their relative strength of direction toward completion—strongly directed, moderately directed, or not directed. To be classified as *strongly directed*, students were required to report

intentions to complete a program of study (4-year transfer, AA degree,[1] or vocational certificate) as a purpose for enrolling in their community college and to attend at least half time during their first year (2003–04),[2] and degree-seeking students were required to be enrolled in a formal degree program when they first started. Students with AA intentions had to be enrolled in an AA degree program, and students with certificate intentions could be enrolled in an AA or certificate program. Students in 4-year transfer programs were not required to be enrolled in a formal degree program; however, a majority were enrolled in AA programs.[3]

Students who did not meet the strongly directed criteria were designated as *moderately directed* if they either reported intentions to complete a program *or* were enrolled in a formal AA or certificate program, regardless of their attendance status. All other students were designated as *not directed*. These students reported no intentions to complete a community college credential or transfer to a 4-year institution *and* they were not enrolled in a formal degree program. Within the two directed groups, students were divided into their programs of study: 4-year transfer, AA degree, or vocational certificate, which for simplicity are referred to as "tracks." If students reported intentions to complete multiple programs, they were assigned to a track in the following order: 4-year transfer, AA degree, and certificate.

Figure 1 displays the distribution of beginning community college students within the taxonomy. Some 56 percent were classified as strongly directed, the majority of whom were in the 4-year transfer track (36 percent); another 38 percent were classified as moderately directed, among whom 16 percent were in the 4-year transfer track and 19 percent in the AA track; the remaining 6 percent were classified as not directed. A relatively small percentage of beginning community college students classified in either group were in the certificate track (4 percent).

Limitations of the CCT

It should be kept in mind that, although the three CCT classifications are labeled "strongly directed," "moderately directed," and "not directed," the CCT is based on self-reported program enrollment and intentions regarding academic degree or

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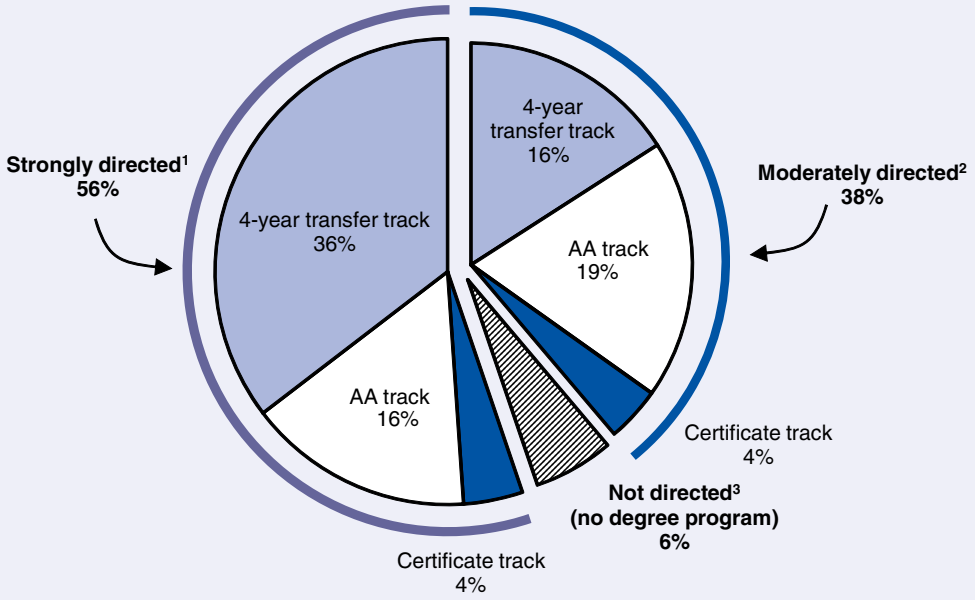
[1] Both Associate of Art (AA) and Associate of Science (AS) degrees are included. For simplicity, the acronym AA is used to refer to both degrees.

[2] They had to attend at least half time for the duration of their first enrollment, whether it lasted the entire year or not.

[3] For example, among students who reported intentions of transferring to a 4-year college and who attended at least half time, roughly 80 percent were enrolled in AA programs (BPS Data Analysis System; data not shown).

Figure 1. Percentage distribution of 2003–04 beginning community college students, by Community College Taxonomy: 2006



[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet "strongly directed" criteria, but enrolled in a formal degree/certificate program or reported intentions to complete a credential or 4-year transfer.

[3] Not enrolled in formal degree/certificate program and did not report intentions to complete a credential or 4-year transfer.

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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

certificate attainment; it does not address the goals, motivations, or situational conditions that may underlie these behaviors and intentions at any given point in time, or across time. Research has shown that self-reported data are not as reliable as administrative data (Adelman 1999). Moreover, research based on data from an earlier BPS cohort indicate that students may change their goals over time, with roughly equal proportions lowering or raising their expectations (Bailey, Leinbach, and Jenkins 2006).

Classifying students within the CCT is not meant to imply that students who do not fit the profile of being strongly directed are less committed to their studies than those who do. In fact, the terminology of the CCT was changed from the original study (Horn and Nevill 2006), which referred to levels of commitment (more committed, less committed, and not committed) rather than directedness. The new terminology better reflects enrollment choices, which can be constrained by family responsibilities, work needs, and other external responsibilities. For example, some students may be expected to contribute to their family's income and are obliged to

work full time to do so. These work responsibilities may limit college attendance to less than half time or prevent students from pursuing formal programs of study. In other words, many students may be goal oriented but are hampered in making progress toward their goals in ways not captured in the BPS data.

The CCT is meant to be an analytic tool based on empirical data to help understand the paths community college students embark on to achieve their educational goals. As such, readers are cautioned not to make any causal inferences from the findings in the study. The results are entirely descriptive and meant only to demonstrate associations.

Student Characteristics and the Community College Taxonomy

How do student characteristics and educational experiences vary with the CCT? This question is addressed in this section of the report. Student demographic characteristics include age, gender, race/ethnicity, income, and parents' education levels. The analysis also examines students' financial aid receipt and employment status in their first year of community college enrollment as well as indicators of high school academic preparation.

Demographic Differences

As Horn and Nevill (2006) found in their earlier study, age had a statistically significant association with the CCT. The average age of students increased from age 22 to 26 to 31 among students classified as strongly, moderately, or not directed, respectively (table 1-A). Looking at specific age groups, students 18 or younger constituted 39 percent of strongly directed students, compared with 28 percent and 18 percent, respectively, of moderately and not directed students. Students age 18 or younger also constituted a higher percentage of strongly directed than of moderately directed students, both overall and in the 4-year transfer and AA tracks. Conversely, students in the oldest age group—30 or older—constituted 12 percent of strongly directed students, compared with 27 percent and 41 percent, respectively, of moderately and not directed students. Students age 30 or older constituted a lower percentage of strongly directed than of moderately directed students in all three tracks. While Horn and Nevill found differences by gender and race/ethnicity within the CCT, variations by these characteristics were less apparent for the current study based on beginning community college students, who tend to be younger than all undergraduates as a whole and otherwise more closely resemble traditional students (Berkner, He, and Cataldi 2002). The proportions of students who were men and women did not vary among CCT categories (table 1-B). Differences by race/ethnicity were statistically significant only within the certificate track, where Hispanic students constituted a higher percentage of moderately directed students

Table 1-A. Age distribution as of 12/31/03 among 2003–04 beginning community college students, by Community College Taxonomy: 2006

Community college taxonomy	Age groups as of 12/31/03					Average age
	18 or younger	19	20–23	24–29	30 or older	
Total	**33.6**	**21.8**	**16.2**	**9.0**	**19.4**	**23.8**
Program direction levels						
Strongly directed[1]	39.2	25.3	15.8	8.1	11.6	21.8
Moderately directed[2]	27.9	18.1	17.2	9.6	27.1	25.7
Not directed[3]	18.3	13.4	13.7	13.5	41.1	30.6
Program track and direction levels						
4-year transfer track						
Strongly directed[1]	45.7	26.4	15.2	6.7	6.0	20.4
Moderately directed[2]	36.3	22.9	18.1	6.2	16.6	23.1
AA track						
Strongly directed[1]	31.1	24.1	15.4	8.8	20.7	23.8
Moderately directed[2]	24.6	15.8	17.2	10.6	31.8	26.8
Certificate track						
Strongly directed[1]	13.8	20.9	22.8	17.7	24.8	26.1
Moderately directed[2]	10.3	10.0	13.1	19.4	47.2	30.8

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

than of strongly directed students (25 vs. 8 percent) (table 1-C). The opposite appears to be the case for the percentages of the moderately and strongly directed groups who were White, but the difference was not statistically significant. Variations by income and parents' education levels also were observed among CCT categories. Overall, low-income students constituted a larger percentage of strongly and moderately directed students than of students classified as not directed (30 and 28 percent vs. 17 percent), while high-income students constituted a smaller percentage of strongly directed students than of moderately directed and not directed students (15 percent vs. 21 and 25 percent). The latter finding was also statistically

Table 1-B. Gender distribution of 2003–04 beginning community college students, by Community College Taxonomy: 2006

Community college taxonomy	Male	Female
Total	**43.8**	**56.2**
Program direction levels		
Strongly directed[1]	43.5	56.5
Moderately directed[2]	43.7	56.3
Not directed[3]	47.0	53.0
Program track and direction levels		
4-year transfer track		
Strongly directed[1]	46.9	53.1
Moderately directed[2]	45.8	54.2
AA track		
Strongly directed[1]	37.4	62.6
Moderately directed[2]	42.1	57.9
Certificate track		
Strongly directed[1]	38.3	61.7
Moderately directed[2]	43.0	57.0

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

significant for students in the 4-year transfer and AA tracks (table 2-A).[4] With respect to parents' education levels, a higher percentage of students in the moderately directed than the strongly directed group came from families in which neither parent had an education beyond high school (46 percent vs. 39 percent) (table 2-B). In other words, moderately directed students were more likely than strongly directed students to be both from high-income families and from families in which neither parent attended college. These two characteristics have opposite associations with student outcomes. Higher incomes are generally associated with higher rates of degree attainment or program completion, while lower levels of parents' education are associated with lower rates (Berkner, He, and Cataldi 2002).

[4] "Low-income" is defined as incomes in the lowest 25 percent. For dependent students (those typically under age 24), income level is based on parents' income, while for independent students, it is based on their own income. Income percentiles are determined separately for dependent and independent students. See glossary entry for INCGRP for more details.

Table 1-C. Race/ethnicity distribution of 2003–04 beginning community college students, by Community College Taxonomy: 2006

Community college taxonomy	White	Hispanic or Latino	Black or African American	Asian	American Indian or Alaska Native	Others[4]
Total	**61.0**	**16.0**	**13.9**	**4.0**	**0.8**	**4.3**
Program direction levels						
Strongly directed[1]	62.2	14.7	14.2	4.3	0.7	4.0
Moderately directed[2]	59.0	17.4	14.0	3.6	0.8	5.1
Not directed[3]	62.5	19.8	10.0	4.6	0.9	2.3
Program track and direction levels						
4-year transfer track						
Strongly directed[1]	59.8	15.8	13.7	5.3	0.5	4.8
Moderately directed[2]	56.9	19.8	13.2	4.8	0.6	4.9
AA track						
Strongly directed[1]	66.4	13.8	14.1	2.1	1.2	2.4
Moderately directed[2]	61.9	13.9	14.3	3.4	1.2	5.3
Certificate track						
Strongly directed[1]	66.7	8.0	18.7	3.3	0.4	2.9
Moderately directed[2]	53.6	24.8	16.3	#	0.3	5.0

Rounds to zero.

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

[4] Multiple race and "other."

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Table 2-A. Income group distribution and percentage of 2003–04 beginning community college students with incomes at or below poverty level in 2003, by Community College Taxonomy: 2006

Community college taxonomy	Low income	Middle income	High income	At or below poverty level
Total	**28.3**	**53.8**	**17.9**	**22.1**
Program direction levels				
Strongly directed[1]	30.0	54.9	15.1	22.5
Moderately directed[2]	27.6	51.5	20.9	22.4
Not directed[3]	16.6	57.9	25.5	17.2
Program track and direction levels				
4-year transfer track				
Strongly directed[1]	29.7	54.1	16.3	19.8
Moderately directed[2]	26.7	50.5	22.7	20.7
AA track				
Strongly directed[1]	30.3	57.5	12.2	25.2
Moderately directed[2]	27.4	52.3	20.3	22.5
Certificate track				
Strongly directed[1]	31.8	51.8	16.4	35.7
Moderately directed[2]	32.5	51.3	16.1	28.7

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Table 2-B. Percentage distribution of parents' highest education level among 2003–04 beginning community college students, by Community College Taxonomy: 2006

Community college taxonomy	High school or less	Some college	Bachelor's degree or higher
Total	**42.4**	**28.7**	**29.0**
Program direction levels			
Strongly directed[1]	38.5	30.8	30.6
Moderately directed[2]	46.0	26.8	27.2
Not directed[3]	55.3	20.3	24.3
Program track and direction levels			
4-year transfer track			
Strongly directed[1]	34.2	30.9	34.9
Moderately directed[2]	39.2	26.8	34.1
AA track			
Strongly directed[1]	43.8	31.3	24.9
Moderately directed[2]	48.3	27.4	24.3
Certificate track			
Strongly directed[1]	55.5	28.6	15.9
Moderately directed[2]	62.5	24.0	13.5

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Financial Aid and Work

Due at least in part to their greater likelihood of attending classes at least half time (a criterion for financial aid eligibility), a higher percentage of strongly directed students received Pell Grants and federal student (Stafford) loans than did their peers in the moderately directed and not directed groups (table 3). The differences were statistically significant overall and within each track. This finding is also consistent with the income pattern described above, in which high-income students made up a higher percentage of the moderately directed than of the strongly directed groups.

Despite these differences in aid receipt, roughly three-quarters of beginning community college students worked while enrolled regardless of their CCT classification. Although strongly directed students worked fewer hours per week on average than students classified as moderately or not directed, they still worked an average of 28 hours/week, compared with 32 hours/week and 34 hours/week, respectively, for moderately directed and not directed students.

Table 3. Percentage of 2003–04 beginning community college students who received a Pell Grant or Stafford loan at any time during their enrollment, and the percentage of students working while enrolled in their first year and average hours worked, by Community College Taxonomy: 2006

Community college taxonomy	Any Pell Grant	Any Stafford loan	Worked while enrolled 2003–04	Average hours worked/ enrolled
Total	**33.7**	**23.3**	**77.2**	**29.7**
Program direction levels				
Strongly directed[1]	38.3	28.7	78.2	27.7
Moderately directed[2]	29.6	17.0	75.9	31.9
Not directed[3]	17.6	14.3	76.7	34.0
Program track and direction levels				
4-year transfer track				
Strongly directed[1]	35.3	29.2	80.1	27.0
Moderately directed[2]	26.2	16.4	79.0	30.5
AA track				
Strongly directed[1]	44.1	28.2	76.1	29.1
Moderately directed[2]	32.7	18.6	75.1	32.3
Certificate track				
Strongly directed[1]	42.1	26.7	69.8	29.6
Moderately directed[2]	28.7	11.9	67.2	36.7

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Academic Indicators

In addition to the differences noted above, students designated as strongly directed appeared more academically prepared than did the moderately directed and not directed groups, as measured by the highest mathematics course they reported taking in high school (table 4-A).[5] Some 38 percent of strongly directed students reported taking mathematics courses beyond algebra 2, compared with 31 percent of moderately directed and 26 percent of those classified as not directed.

Table 4-A. Percentage distribution of 2003–04 beginning community college students' highest level of mathematics they reported completing in high school, by Community College Taxonomy: 2006

Community college taxonomy	Below algebra 1	Algebra 2	Above algebra 2
Total	**24.6**	**40.3**	**35.1**
Program direction levels			
Strongly directed[1]	21.9	40.5	37.6
Moderately directed[2]	28.7	39.9	31.4
Not directed[3]	33.2	40.6	26.2
Program track and direction levels			
4-year transfer track			
Strongly directed[1]	19.9	40.0	40.0
Moderately directed[2]	24.7	37.8	37.5
AA track			
Strongly directed[1]	27.1	40.8	32.0
Moderately directed[2]	32.6	40.9	26.4
Certificate track			
Strongly directed[1]	22.1	45.1	32.8
Moderately directed[2]	34.5	50.5	15.0

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Highest mathematics course completed only reported by students under age 24. Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

[5] This information was only reported by students under age 24, so students 25 or older were excluded from this comparison.

Perhaps paradoxically, as shown in table 4-B, strongly directed students also took remedial mathematics in their first year more often than their peers classified as moderately or not directed (25 percent vs. 20 percent and 12 percent). Based on an earlier BPS cohort, Dougherty and Kienzl (2006) reported that remedial math participation was associated with higher transfer rates. The authors suggested that there is a great deal of self-selection in remedial math participation and that students taking remedial math might be more motivated to achieve success.

Table 4-B. Percentage of 2003–04 beginning community college students who reported taking remedial courses in their first year, by Community College Taxonomy: 2006

Community college taxonomy	Any remedial courses	English	Mathematics	Reading	Writing	Study Skills
Total	**28.5**	**8.3**	**22.4**	**10.1**	**9.6**	**2.8**
Program direction levels						
Strongly directed[1]	31.9	9.3	25.0	11.0	10.4	2.9
Moderately directed[2]	25.8	7.2	20.4	10.0	9.3	2.8
Not directed[3]	15.2	5.6	11.6	3.1	4.7	2.0
Program track and direction levels						
4-year transfer track						
Strongly directed[1]	32.5	9.3	25.1	10.7	10.4	2.8
Moderately directed[2]	27.9	7.7	21.6	11.8	9.3	3.1
AA track						
Strongly directed[1]	31.4	9.0	25.8	10.9	9.6	3.1
Moderately directed[2]	25.2	6.7	20.0	9.1	9.9	2.9
Certificate track						
Strongly directed[1]	29.0	10.2	21.4	13.5	13.1	2.8
Moderately directed[2]	20.5	8.0	17.3	6.6	6.7	1.7

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

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Enrollment Status After 3 Years

This study examines enrollment status from both an institutional perspective (institutional retention) and a student perspective (systemwide persistence). *Institutional retention* is defined as the percentage of students who complete a program of study or maintain enrollment at their *first* institution. Completion includes AA degree attainment, vocational certificate completion, or transfer to a 4-year institution. Students who transfer laterally to a 2-year or less-than-2-year institution or leave without any degree or certificate are not considered retained.

Persistence is a systemwide outcome defined as the percentage of students who complete or maintain their enrollment in *any* postsecondary institution. Thus, all transfer students (even those who transfer laterally or to less-than-2-year institutions) have persisted by definition if they are still enrolled after 3 years.

Institutional Retention

The enrollment status of first-time community college students 3 years after they first enrolled in 2003–04 is shown in table 5. Forty-nine percent of all first-time community college students had been retained in their first institution, meaning they were still enrolled or had completed a credential at their first institution or had transferred to a 4-year institution.

From the perspective of the CCT, a higher percentage of strongly directed students (57 percent) had been retained by their first institution, compared with their less directed counterparts. Some 41 percent of moderately directed students had been retained, as had 33 percent of those designated as not directed.

Within the individual tracks, strongly directed students in the 4-year transfer and AA tracks were retained at higher percentages than were moderately directed students. For example, in the AA track, 55 percent of the strongly directed students were retained, compared with 35 percent of moderately directed students. Differences in retention among students in the certificate track, on the other hand, were not observed: 49 percent of strongly directed students had been retained, as had 47 percent of moderately directed students.

Table 5. Percentage of 2003–04 beginning community college students who were retained at their first institution for 3 years, by Community College Taxonomy: 2006

Community college taxonomy	Retained at first institution for 3 years					
	Total	Still enrolled, no degree	Transferred to 4-year college	Attained AA or certificate	No degree, transferred to 2-year or less	No degree, not enrolled
Total	**49.4**	**26.7**	**11.5**	**11.2**	**8.1**	**42.5**
Program direction levels						
Strongly directed[1]	57.0	29.6	15.1	12.3	7.4	35.6
Moderately directed[2]	41.1	23.6	7.0	10.5	8.3	50.5
Not directed[3]	32.5	20.8	6.0	5.7	12.3	55.2
Program track and direction levels						
4-year transfer track						
Strongly directed[1]	59.0	29.6	20.2	9.2	8.6	32.5
Moderately directed[2]	47.3	28.6	11.7	7.0	7.2	45.5
AA track						
Strongly directed[1]	54.6	32.7	5.9	16.0	5.0	40.4
Moderately directed[2]	34.9	21.7	4.1	9.0	9.8	55.3
Certificate track						
Strongly directed[1]	49.2	17.8	6.3	25.0	6.7	44.1
Moderately directed[2]	46.6	11.8	2.3	32.5	6.0	47.4

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Student Persistence

Among community college students who enrolled for the first time in 2003–04, some 55 percent had persisted for 3 years (table 6). The remaining 45 percent had left postsecondary education altogether without any credential.

From the perspective of the CCT, 3-year persistence was higher for strongly directed than for moderately or not directed groups. Some 62 percent of strongly directed students persisted over 3 years, compared with 48 percent of moderately directed and 42 percent of those identified as not directed. The same pattern was observed within the 4-year and AA tracks; proportionately more strongly directed students had persisted than moderately directed students. Statistically significant differences in persistence were not detected among students in the certificate tracks.

Table 6. Percentage of 2003–04 beginning community college students who persisted in postsecondary education for 3 years, by Community College Taxonomy: 2006

Community college taxonomy	Persisted for 3 years: Total persisted	Attained, still enrolled	Attained, not enrolled	No degree, still enrolled	No degree, not enrolled
Total	**55.2**	**10.3**	**5.4**	**39.5**	44.8
Program direction levels					
Strongly directed[1]	61.9	13.2	5.0	43.7	38.1
Moderately directed[2]	47.7	7.5	6.1	34.0	52.3
Not directed[3]	41.6	1.8	4.4	35.4	58.4
Program track and direction levels					
4-year transfer track					
Strongly directed[1]	64.4	13.6	2.6	48.2	35.6
Moderately directed[2]	52.8	8.8	2.5	41.5	47.2
AA track					
Strongly directed[1]	58.1	12.2	7.4	38.4	41.9
Moderately directed[2]	42.6	6.2	4.9	31.5	57.4
Certificate track					
Strongly directed[1]	54.4	13.1	17.2	24.1	45.6
Moderately directed[2]	51.7	9.1	26.9	15.8	48.3

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Enrollment Continuity

While a majority of students had persisted for the 3-year period under study, not all had attended continuously. Among beginning community college students who had persisted, 65 percent had maintained their enrollment continuously, while the remaining 35 percent had stopped out for 5 or more months at least once (table 7). From the perspective of the CCT, students classified as not directed toward completion stopped out at higher rates than either those who were classified as strongly directed or moderately directed (58 vs. 32 and 37 percent). In contrast to the retention and persistence findings, enrollment continuity was not measurably different between strongly and moderately directed students, with one exception: in the AA track, 29 percent of the strongly directed students had stopped out, compared with 43 percent of their moderately directed peers.

Table 7. Among 2003–04 beginning community college students who were still enrolled after 3 years, the percentage who took an enrollment break of 5 or more months (stopped out) at least once, by Community College Taxonomy: 2006

Community college taxonomy	Continuously enrolled	Stopped out		
		Total	One stopout	Two or more stopouts
Total	**64.9**	**35.1**	**32.9**	**2.2**
Program direction levels				
Strongly directed[1]	67.9	32.1	30.3	1.8
Moderately directed[2]	63.1	36.9	34.0	2.8
Not directed[3]	41.8	58.2	54.8	3.3
Program track and direction levels				
4-year transfer track				
Strongly directed[1]	67.7	32.3	30.5	1.8
Moderately directed[2]	69.6	30.4	26.7	3.7
AA track				
Strongly directed[1]	70.6	29.4	27.0	2.3
Moderately directed[2]	57.2	42.8	41.0	1.9
Certificate track				
Strongly directed[1]	54.9	45.1	45.1	#
Moderately directed[2]	47.9	52.1	45.4	2.5

Rounds to zero.

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Degree or Certificate Attainment

As of 2006, or about 3 years after first-time community college students began their enrollment, some 10 percent had completed an AA (table 8). A higher percentage of strongly directed students had earned an AA (13 percent) than their moderately directed peers (6 percent). This might be expected because strongly directed students attended half time or more during their first year of enrollment by definition, so they probably took more courses toward a degree. For those in the 4-year transfer track, 13 percent of strongly directed students had completed an AA, compared with 8 percent of moderately directed students. Comparable percentages for students in the AA track were 14 percent and 6 percent.

Table 8. Percentage of 2003–04 beginning community college students who attained a degree or certificate after 3 years, by Community College Taxonomy: 2006

Community college taxonomy	Total attained	Highest degree attained at first institution 2006	
		Associate's degree	Certificate
Total	**14.3**	**9.7**	**4.6**
Program direction levels			
Strongly directed[1]	16.8	13.1	3.6
Moderately directed[2]	12.1	6.3	5.8
Not directed[3]	5.8	0.3	5.5
Program track and direction levels			
4-year transfer track			
Strongly directed[1]	14.6	13.4	1.2
Moderately directed[2]	9.9	7.6	2.4
AA track			
Strongly directed[1]	18.3	13.8	4.5
Moderately directed[2]	9.5	5.7	3.8
Certificate track			
Strongly directed[1]	29.8	8.6	21.2
Moderately directed[2]	34.1	3.9	30.2

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Unlike AA programs, certificate programs tend to be short-term, with many lasting a year or less (Grubb 1997). Certificate completion relative to CCT classifications was inconclusive due largely to small sample sizes. While it appears as though a lower percentage of strongly directed than of moderately directed students in the certificate track completed a certificate within 3 years (21 vs. 30 percent), and a higher percentage completed an AA (9 percent vs. 4 percent), neither difference was statistically significant; likewise statistically significant differences in certificate completion were not detected between strongly and moderately directed students in either the AA or 4-year transfer track.

For students designated as not directed, despite beginning their enrollment with no reported intentions of completing a credential, 6 percent had obtained a credential within 3 years; nearly all of these students had completed a certificate (5 percent).

Transfer

One of the primary functions of community colleges is preparing students to transfer to baccalaureate programs at 4-year institutions (Cohen and Brawer 2003). This study examines transfer in detail, looking at transfer destination, timing of transfer, and continuity of enrollment among transfers. The results indicate that among all community college students, students transferred to 4-year institutions at a higher rate than they did to 2-year institutions.

Three years after enrolling in a community college, 20 percent of community college students had transferred to another institution, 11 percent to a 4-year college or university, and 8 percent to another 2-year institution (table 9-A). Less than 1 percent transferred to a less-than-2-year institution.

Table 9-A. Percentage of 2003–04 beginning community college students who transferred from their community college and the destination of transfer, by Community College Taxonomy: 2006

Community college taxonomy	Transferred	Transfer destination		
		4-year	Other 2-year	Less-than 2-year
Total	**19.5**	**11.5**	**7.6**	**0.5**
Program direction levels				
Strongly directed[1]	22.5	15.1	7.0	0.4
Moderately directed[2]	15.4	7.0	7.7	0.6
Not directed[3]	18.3	6.0	12.0	0.2
Program track and direction levels				
4-year transfer track				
Strongly directed[1]	28.8	20.2	8.2	0.4
Moderately directed[2]	18.8	11.7	6.8	0.3
AA track				
Strongly directed[1]	10.9	5.9	4.6	0.4
Moderately directed[2]	13.9	4.1	8.8	1.0
Certificate track				
Strongly directed[1]	13.0	6.3	6.6	0.1
Moderately directed[2]	8.3	2.3	6.0	0.1

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Some 20 percent of the strongly directed students in the 4-year transfer track had achieved a 4-year transfer, a higher percentage than their moderately directed peers (12 percent) as well as all students in the AA and certificate tracks, whether they were strongly directed, moderately directed, or not directed. Eight percent of the strongly directed 4-year transfer track students had made a lateral transfer to another 2-year institution, as had 7 percent of their moderately directed peers.

Among AA track students, 11 percent of the strongly directed students and 14 percent of their moderately directed peers had transferred to another institution, a difference that is not statistically significant. However, the transfer destination of AA track students did vary with CCT classifications. Among strongly directed AA track transfers, 6 percent and 5 percent, respectively, transferred to a 4-year institution and a 2-year institution, a difference that is not statistically significant, while among their moderately directed peers, a greater percentage transferred to another 2-year institution (9 percent) than to a 4-year college (4 percent).

Among students in the certificate track, 13 percent of strongly directed and 8 percent of moderately students had transferred to another institution, a difference not statistically significant due in large part to small sample sizes. Roughly half of strongly directed certificate track students had transferred to a 4-year institution (6 percent) and the other half to a 2-year institution (7 percent). For those in the moderately directed certificate track, 2 percent had transferred to a 4-year institution and 6 percent to another 2-year institution.

Transfers also occurred among students classified as not directed. In fact, their rate of transfer (18 percent) approached the rate for all community college students (20 percent); i.e., the difference between the two groups is not statistically significant. Some 6 percent of students classified as not directed had transferred to a 4-year institution and 12 percent to a 2-year institution.

Timing of Transfer

Some students transfer immediately to their new institution, while others delay their transfer and "stopout" for periods of time. Students transferring to 4-year institutions delayed at about half the rate (23 percent) as those transferring to another 2-year institution (47 percent) (table 9-B). In the context of the CCT, differences in delayed transfer were evident among students transferring to 4-year institutions—strongly directed students delayed at a lower rate than moderately directed transfers (20 vs. 32 percent)—but the same was not evident among transfers to 2-year institutions. For individual tracks, a statistically significant difference was found

Table 9-B. Percentage who transferred immediately or delayed 5 or more months among 2003–04 beginning community college students who transferred, by transfer destination and Community College Taxonomy: 2006

Community college taxonomy	4-year transfer timing		2-year transfer timing	
	Immediate	Delayed	Immediate	Delayed
Total	**77.3**	**22.7**	**52.9**	**47.1**
Program direction levels				
Strongly directed[1]	79.9	20.1	56.5	43.5
Moderately directed[2]	68.2	31.8	53.3	46.7
Not directed[3]	‡	‡	‡	‡
Program track and direction levels				
4-year transfer track				
Strongly directed[1]	80.0	20.0	56.6	43.4
Moderately directed[2]	73.6	26.4	66.2	33.8
AA track				
Strongly directed[1]	88.1	11.9	49.0	51.0
Moderately directed[2]	58.7	41.3	48.7	51.3
Certificate track				
Strongly directed[1]	‡	‡	‡	‡
Moderately directed[2]	‡	‡	‡	‡

‡ Reporting standards not met. (Too few cases for a reliable estimate.)

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. Detail may not sum to totals because of rounding. Standard error tables are available at http://nces.ed.gov/das/library/reports.asp.

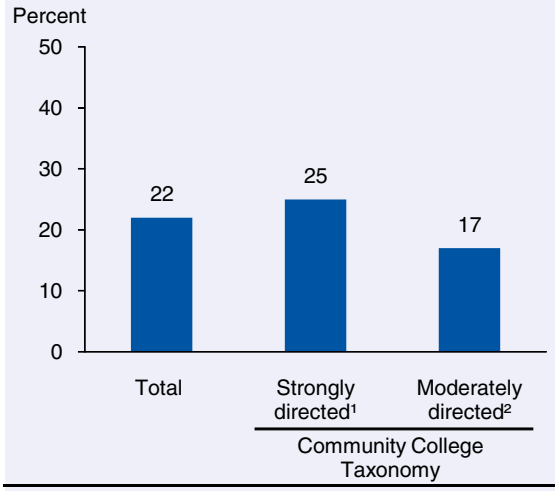
SOURCE: U.S. Department of Education, National Center for Education Statistics, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

for those in the AA track; among those who transferred to a 4-year institution, 12 percent of strongly directed students delayed transfer for 5 months or more, while 41 percent of moderately directed students did so. Comparable percentages for students in the 4-year track (20 vs. 26 percent) were not statistically significant.

Attainment Before Transfer

Earlier research on transfer based on comparable data (BPS:1989–94) found that community college students who earned an AA prior to transfer to a baccalaureate institution attained a bachelor's degree at a higher rate than their peers who transferred without an AA degree (McCormick 1997). For example, McCormick found that 43 percent of students who transferred with an AA degree had earned a bachelor's degree within 5 years of enrolling, compared with 17 percent who transferred without an AA. Moreover, the difference was not attributable to the

Figure 2. Percentage who attained an AA before transferring among 2003–04 beginning community college students who transferred to a 4-year institution, by Community College Taxonomy: 2006



[1] Reported intentions of completing the specified program and enrolled at least half time.
[2] Did not meet "strongly directed" criteria, but enrolled in a formal degree/certificate program or reported intentions to complete a credential or 4-year program.
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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

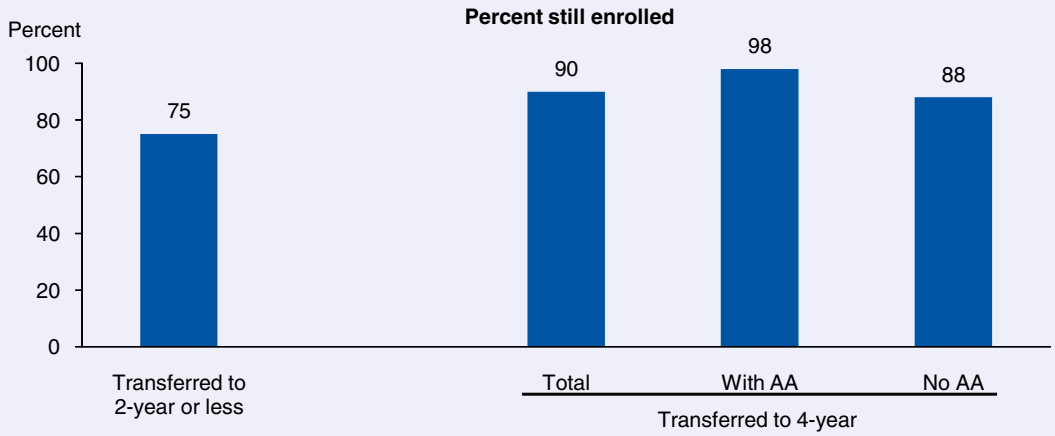
percentage still enrolled, as 45 percent of those with an AA and 44 percent of those without one were still enrolled.

In the current study, 22 percent of 4-year transfers had attained an AA before they transferred (figure 2). In the context of the CCT, it appears as though strongly directed transfers attained an AA at a higher rate than did moderately directed transfers (25 vs. 17 percent), but due in part to the small sample sizes, the difference is not statistically significant.

Persistence After Transfer

Among students who transferred from their first institution, most were still enrolled at the transfer institution 3 years after they enrolled in their first institution (figure 3). Some 90 percent of those who transferred to 4-year institution were still enrolled in 2005–06, compared with 75 percent of those who transferred to 2-year institutions. Moreover, consistent with earlier research showing higher bachelor's degree attainment rates for 4-year transfers who attained AAs (McCormick 1997), 4-year transfers who attained an AA prior to transferring persisted at higher rates than those who had not attained an AA (98 vs. 88 percent).

Figure 3. Percentage who were still enrolled among 2003–04 beginning community college students who transferred, by transfer destination and AA degree attainment among 4-year transfers: 2006



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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

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Year-to-Year Attrition

The rate of attrition in a specific year is defined as the percentage of students who were no longer enrolled in any postsecondary institution and had not completed a program of study. A previous study on community college students based on an earlier BPS cohort showed that student attrition is highest in the first year of enrollment and declines afterward (Bradburn 2002). Similarly, in this study, a total of 23 percent had left in their first year followed by a decline to 14 percent who left in their second year (table 10). First-year leavers are students whose last enrollment was in 2003–04 and who never enrolled again in subsequent years (2004–05 and 2005–06). Likewise, second-year leavers are those whose last enrollment was in

Table 10. Percentage of 2003–04 beginning community college students who left without a credential after 3 years, and the percentage who left each year, by Community College Taxonomy: 2006

Community college taxonomy	Total departed	First year 2003–04	Second year 2004–05	Third year fall 2005
Total	**44.8**	**22.9**	**13.7**	**7.7**
Program direction levels				
Strongly directed[1]	38.1	16.4	13.1	8.0
Moderately directed[2]	52.3	29.3	15.4	7.3
Not directed[3]	58.4	40.9	9.1	6.4
Program track and direction levels				
4-year transfer track				
Strongly directed[1]	35.6	14.9	12.2	7.6
Moderately directed[2]	47.2	21.0	18.2	7.7
AA track				
Strongly directed[1]	41.9	17.7	14.9	9.1
Moderately directed[2]	57.4	36.0	13.4	7.4
Certificate track				
Strongly directed[1]	45.6	25.0	13.4	7.2
Moderately directed[2]	48.3	29.9	13.0	5.2

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

2004–05 with no subsequent re-enrollment, and third-year leavers are those whose last enrollment was in fall 2005, but who were not enrolled as of spring 2006.

When viewed in the context of the CCT, the timing of attrition varied, especially in the first year. Strongly directed students left in their first year at a lower rate than their peers designated as moderately directed or not directed (16 percent vs. 29 and 41 percent). After the high first-year attrition of students designated as not directed relative to strongly and moderately directed students, these students experienced lower attrition in their second year than their strongly and moderately directed peers (9 vs. 13 and 15 percent).

After the first year of enrollment, statistically significant differences in attrition rates between strongly and moderately directed students could no longer be detected either in their second year (13 vs. 15 percent) or third year (8 vs. 7 percent), and in the third year, no differences in attrition could be detected among strongly, moderately, and not directed students.

Reasons for Leaving

Students who were no longer enrolled and had not earned a credential were asked why they had left postsecondary education. This question was in the first student interview in 2004 and in the follow-up interview in 2006. The first interview captured students who left in their first year, while the second interview captured those who left later. Possible reasons for leaving are displayed in table 11-A. Among students who left in their first year, leaving for "personal" reasons was most commonly reported (49 percent). The next most cited reasons were either "financial" or "other," reported by about 30 percent of first-year leavers. With two exceptions, differences in the reasons students reported for leaving were not statistically significant within the CCT. The two exceptions were for students in the AA track, among whom strongly directed students were more likely to report financial reasons and less likely to report they were finished taking desired courses than their moderately directed counterparts.

Comparing the reasons cited for leaving between those who left in their first year and those who left in their second or third year yielded a number of differences (tables 11-A and 11-B). First-year leavers cited financial reasons (29 vs. 18 percent) and family reasons (17 vs. 9 percent) more often than did later leavers, while relatively more of those who left later reported reasons related to scheduling problems (20 vs. 10 percent) or that they had finished taking the classes they wanted to take (9 vs. 3 percent).

Table 11-A. Percentage reporting various reasons for leaving among 2003–04 beginning postsecondary students who left postsecondary education as of 2004 with no degree or certificate, by Community College Taxonomy: 2006

	First-year leavers							
Community college taxonomy	Academic problems	Scheduling problems	Dissatis-faction with program	Financial reasons	Family reasons	Personal reasons	Finished desired classes	Other reason
Total	**12.3**	**9.9**	**11.9**	**29.1**	**16.9**	**48.8**	**2.6**	**29.8**
Program direction levels								
Strongly directed[1]	9.6	9.4	14.2	31.6	17.6	52.3	1.9	26.8
Moderately directed[2]	14.5	10.5	10.1	25.9	17.2	48.1	2.7	32.3
Not directed[3]	12.6	9.5	11.8	33.9	12.9	39.2	4.8	29.5
Program track and direction levels								
4-year transfer track								
Strongly directed[1]	9.3	9.2	13.1	29.0	14.8	55.3	3.2	27.8
Moderately directed[2]	10.2	11.9	10.4	26.0	19.6	49.0	1.4	30.2
AA track								
Strongly directed[1]	12.4	11.4	15.8	37.3	23.9	47.3	0.1	26.3
Moderately directed[2]	15.8	10.1	9.3	25.7	16.1	50.5	3.4	30.6
Certificate track								
Strongly directed[1]	4.5	5.6	14.7	29.9	15.5	50.7	0.7	24.0
Moderately directed[2]	18.2	9.3	12.6	26.6	16.9	34.9	2.0	44.9

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Table 11-B. Percentage reporting various reasons for leaving among 2003–04 beginning postsecondary students who left postsecondary education as of 2006 with no degree or certificate, by Community College Taxonomy: 2006

	Second- or third-year leavers							
Community college taxonomy	Academic problems	Scheduling problems	Dissatis-faction with program	Financial reasons	Family reasons	Personal reasons	Finished desired classes	Other reason
Total	**7.2**	**20.3**	**11.3**	**17.9**	**9.3**	**50.0**	**9.4**	**25.1**
Program direction levels								
Strongly directed[1]	7.4	17.5	10.5	19.4	9.7	49.9	8.2	23.3
Moderately directed[2]	7.7	24.7	10.4	15.7	7.6	50.3	11.8	28.4
Not directed[3]	0.9	15.6	28.5	19.1	18.5	49.1	3.6	18.8
Program track and direction levels								
4-year transfer track								
Strongly directed[1]	9.4	17.0	10.4	23.9	8.6	50.2	6.1	21.0
Moderately directed[2]	7.7	29.8	6.4	11.0	2.9	53.6	4.5	31.6
AA track								
Strongly directed[1]	3.8	19.0	8.4	10.0	10.7	48.0	12.5	28.8
Moderately directed[2]	8.7	19.7	14.6	21.0	11.5	44.3	17.6	24.3
Certificate track								
Strongly directed[1]	6.4	14.7	20.6	23.1	14.5	55.3	6.6	17.6
Moderately directed[2]	1.6	23.8	8.9	13.4	13.4	64.8	21.8	33.1

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Multivariate Findings

As noted earlier, CCT classifications varied with a number of student characteristics, especially age. The CCT also varied with academic preparation measures and other factors such as employment intensity, which in turn, are associated with postsecondary outcomes as shown in earlier research on comparable data (Berkner, He, and Cataldi 2002). To determine if the CCT maintains an association with 3-year outcomes after controlling for these interrelated factors, multivariate analyses were applied. Because the outcomes are dichotomous (i.e., yes or no), the study used logistic regression models. However, readers are cautioned that the multivariate models are entirely descriptive, designed to support findings from the bivariate analysis. No causal inferences should be made.

The multivariate analyses examined three outcomes associated with the CCT as determined in the bivariate analysis. The three outcomes, or dependent variables, are 3-year institutional retention (students completed or maintained their enrollment at their first community college or not); continuity of enrollment (students stopped out within the 3-year study period or not); and first-year attrition (students left in their first year or not). Independent variables include student demographic and socioeconomic characteristics (gender, race/ethnicity, age groups, income levels, Pell Grant recipient status, and parents' education levels); academic preparation indicators (reported highest mathematics course completed in high school and participation in remedial mathematics); and enrollment and employment intensity. The bivariate relationship between the independent variables and the three dependent variables is shown in table 12. For each independent (row) variable, asterisks indicate statistically significant differences between the comparison group (italicized) and other categories for the dependent (column) variable.

Institutional retention models were run for all community college students and also for the following subgroups: younger students (age 23 or younger), older students (age 24 or older), 4-year transfer track students, and AA degree track students.[6] Separate models were run for younger and older students because age was associated

[6] No statistically significant differences by CCT were found for students in the certificate tracks in the bivariate analysis, so no models are presented.

Table 12. Percentage of 2003–04 community colleges who demonstrated selected outcomes, by independent variables included in the logit analysis: 2006

Independent variables	Retention in first institution	Left in first year with no return	Any stopout through 2006 among persisters
Total	**49.4**	**22.9**	**35.0**
Community college track			
Strongly directed[1]	57.0 *	16.4 *	31.9
Moderately directed[2]	*41.1*	*29.3*	*36.8*
Not directed[3]	32.5 *	40.9 *	58.1 *
Gender			
Male	46.8 *	25.6 *	39.9 *
Female	*51.5*	*20.7*	*31.4*
Race/ethnicity			
Black or African American	41.5 *	25.2	34.9
Hispanic or Latino	48.2	22.4	34.6
Asian	59.1	16.4	29.7
Multiple and all others	48.7	23.3	43.3
White	*51.0*	*22.8*	*34.8*
Age group as of 12/31/03			
19	54.8	17.9	34.2
20 to 23	43.1 *	26.7 *	41.9 *
24 to 29	38.4 *	30.0 *	50.7 *
30 or older	38.6 *	35.9 *	34.2
18 or younger	*58.2*	*14.8*	*30.1*
Income group in 2004			
Low	46.9	23.6	33.7
High	50.9	26.1	36.0
Middle	*50.2*	*21.4*	*35.2*
First Pell Grant			
Pell Grant in first year	47.6	18.2 *	32.6
First Pell Grant in later years	66.5 *	2.9 *	39.1
No Pell Grant	*48.2*	*27.0*	*35.1*
Parent's highest education level 2003–04			
High school or less	44.7 *	26.5 *	35.1
Some postsecondary education	50.2 *	22.4 *	35.4
Bachelor's degree or higher	*56.2*	*17.5*	*34.5*
High school highest mathematics course			
Below algebra 2	48.0 *	21.8 *	34.8
Algebra 2	51.2 *	19.5 *	37.0
Beyond algebra 2	*60.6*	*14.8*	*29.2*

See notes at end of table.

Table 12. Percentage of 2003–04 community colleges who demonstrated selected outcomes, by independent variables included in the logit analysis: 2006—Continued

Independent variables	Retention in first institution	Left in first year with no return	Any stopout through 2006 among persisters
Remedial mathematics in 2003–04			
Yes	46.6	19.8	30.1 *
No	*50.2*	*23.7*	*36.3*
Employment while enrolled 2003–04			
None	50.9	22.2	28.6 *
Full-time (35 or more hours)	40.0 *	31.4 *	38.8
Part-time	*55.5*	*17.0*	*35.7*
Attendance intensity 2003–04			
Part-time	43.4 *	29.3 *	36.7
Exclusively full-time	*57.0*	*14.8*	*33.0*

* Estimate is significantly different from comparison group shown in italics ($p < .05$).

[1] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[2] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[3] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Students attending more than one institution were excluded. 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, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

with CCT classification. In addition, separate models were run for students in the 4-year transfer track and students in the AA track because these groups of students differ from each other in important ways. The 4-year transfer track generally includes students following a pathway to a baccalaureate degree. In contrast, the AA track includes students in more occupationally oriented programs and those who may be less certain of their educational pathway (e.g., students in enrolled in a formal AA program who did not specify completion of the degree as a reason for enrolling).

The results of the logistic regressions are expressed as "odds ratios." An odds ratio compares the odds of one group having an outcome to the odds of another group having the same outcome after controlling for interrelated factors. Odds ratios less than 1 indicate that group A has lower odds of having the outcome of interest than group B does. Odds ratios equal to 1 indicate that the odds of having the outcome are the same for the two groups, and odds ratios greater than 1 indicate that the odds of group A having the outcome are greater than the odds of group B doing so. For example, in table 13-A, the odds ratio of being retained among strongly directed

Table 13-A. Institutional retention odds ratios for 2003–04 beginning community college students and corresponding F-statistics: 2006

Independent variables	All students	
	Odds ratio[1]	Wald F-statistic[2]
Intercept	1.787 *	11.500 (21, 180, 0)
Community college track		23.047 (2, 199, 0)
Strongly directed[3]	1.634 *	
Not directed[4]	0.750	
Moderately directed[5]	†	
Gender		11.125 (1, 200, 0.001)
Male	0.760 *	
Female	†	
Race/ethnicity		2.429 (4, 197, 0.049)
Black	0.745 *	
Hispanic	1.039	
Asian	1.368	
Multiple and all others	0.914	
White	†	
Age group as of 12/31/03		9.810 (4, 197, 0)
19	0.928	
20–23	0.656 *	
24–29	0.542 *	
30 or older	0.633 *	
18 or younger	†	
Income group 2003–04		1.987 (2, 199, 0.14)
Low	0.856	
High	1.113	
Middle	†	
First Pell Grant		12.740 (2, 199, 0)
Pell Grant in first year	0.975	
Pell Grant in later year	2.114 *	
No Pell Grant	†	
Parent's highest education level 2003–04		3.973 (2, 199, 0.02)
High school or less	0.750 *	
Some postsecondary education	0.812 *	
Bachelor's degree or higher	†	

See notes at end of table.

Table 13-A. Institutional retention odds ratios for 2003–04 beginning community college students and corresponding F-statistics: 2006—Continued

Independent variables	All students	
	Odds ratio[1]	Wald F-statistic[2]
Remedial mathematics in 2003–04		10.739 (1, 200, 0.001)
Yes	0.753 *	
No	†	
Hours worked/week while enrolled 2003–04		7.307 (2, 199, 0.001)
None	1.039	
Full-time (35 or more)	0.739 *	
Part-time	†	
Attendance intensity 2003–04		18.47 (1, 200, 0)
Part-time	0.716 *	
Exclusively full-time	†	

† Not applicable or comparison group.

* $p < .05$.

[1] The three pseudo R-squared statistics for the logistic regression model are the negative log likelihood, 0.0622; the Cox-Snell likelihood ratio, 0.082 (maximum = 0.75); and the Estrella likelihood ratio, 0.084.

[2] The Wald F for the intercept is a test of the overall model; the Wald F for each independent variable is displayed in the table; and the numbers in parentheses are the numerator and denominator degrees of freedom and associated p-value.

[3] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[4] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[5] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Comparison group is in italics. Institutional retention is defined as maintaining enrollment, attaining a degree or certificate, or transferring to a 4-year institution from the first institution attended.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

students is 1.634, which means they have roughly 60 percent higher odds than students in the comparison group (moderately directed students) of being retained in their first institution for 3 years. Similarly, in table 13-B, the odds ratio for strongly directed older students is 2.149, which means that strongly directed students age 24 or older have roughly double the odds of being retained as their counterparts who are moderately directed.

Table 13-B. Institutional retention odds ratios for 2003–04 beginning community college students and corresponding F-statistics for students age 23 or younger and students age 24 or older: 2006

Independent variables	Students age 23 or younger		Students age 24 or older	
	Odds ratio[1]	Wald F-statistic[2]	Odds ratio[1]	Wald F-statistic[2]
Intercept	2.466 *	9.23 (21, 180, 0)	0.633	3.415 (16, 185, 0)
Community college track		11.359 (2, 199, 0)		8.235 (2, 199, 0)
Strongly directed[3]	1.454 *		2.149 *	
Not directed[4]	0.666		1.046	
Moderately directed[5]	†		†	
Gender		15.124 (1, 200, 0)		0.146 (1, 200, 0.702)
Male	0.704 *		0.907	
Female	†		†	
Race/ethnicity		2.109 (4, 197, 0.081)		2.720 (3, 198, 0.041)
Black	0.857		0.538 *	
Hispanic	1.172		0.796	
Asian	1.612 *		‡	
Multiple and all others	0.975		0.872	
White	†		†	
Age group as of 12/31/03[6]		7.737 (2, 199, 0.001)		
19	0.943		†	
20–23	0.662 *		†	
18 or younger	†		†	
Income group 2003–04		1.202 (2, 199, 0.303)		2.4431 (2, 199, 0.193)
Low income	0.967		0.557 *	
High	1.183		1.019	
Middle	†		†	
First Pell Grant		7.054 (2, 199, 0.001)		4.408 (2, 199, 0.014)
Pell Grant in first year	0.865		1.121	
Pell Grant in later year	1.765 *		2.973 *	
No Pell Grant	†		†	
Parent's highest education level 2003–04		9.448 (2, 199, 0)		1.637 (2, 199, 0.172)
High school or less	0.632 *		1.336	
Some postsecondary education	0.797 *		0.981	
Bachelor's degree or higher	†		†	
High school highest math course (23 or younger)		5.582 (2, 199, 0.004)		
Below algebra 2	0.725 *		†	
Algebra 2	0.754 *		†	
Beyond algebra 2	†		†	

See notes at end of table.

Table 13-B. Institutional retention odds ratios for 2003–04 beginning community college students and corresponding F-statistics for students age 23 or younger and students age 24 or older: 2006—Continued

Independent variables	Students age 23 or younger		Students age 24 or older	
	Odds ratio[1]	Wald F-statistic[2]	Odds ratio[1]	Wald F-statistic[2]
Remedial mathematics in 2003–04		14.891 (1, 200, 0)		0.129 (1, 200, 0.79)
Yes	0.703 *		1.081	
No	†		†	
Hours worked/week while enrolled 2003–04		4.315 (2, 199, 0.015)		4.208 (2, 199, 0.016)
None	1.079		0.934	
Full-time (35 or more)	0.781 *		0.584 *	
Part-time	†		†	
Attendance intensity 2003–04		11.729 (1, 200, 0.001)		0.776 (1, 200, 0.324)
Part-time	0.702 *		0.851	
Exclusively full-time	†		†	

† Not applicable to age group entirely or to specific comparison group.
‡ Reporting standards not met. (Too few cases for a reliable estimate.)
* $p < .05$.
[1] The three pseudo R-squared statistics for the logistic regression model for students age 23 or younger are the negative log likelihood, 0.056; the Cox-Snell likelihood ratio, 0.075 (maximum = 0.749); and the Estrella likelihood ratio, 0.077; for the students age 24 and older, the negative log likelihood, 0.087; the Cox-Snell likelihood ratio, 0.075 (maximum = 0.736); and the Estrella likelihood ratio, 0.077.
[2] The Wald F for the intercept is a test of the overall model; the Wald F for each independent variable is displayed in the table; and the numbers in parentheses are the numerator and denominator degrees of freedom and associated *p*-value.
[3] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.
[4] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.
[5] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.
[6] Age groups for older students were not broken out because retention rate differences were not statistically significant in the bivariate analysis.
NOTE: Comparison group is in italics.
SOURCE: U.S. Department of Education, National Center for Education Statistics, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Community College Taxonomy Differences

In all five models of institutional retention, students classified as strongly directed to program completion had higher odds of retention than did students who were classified as moderately directed (tables 13-A, 13-B, 14). No differences in odds ratios, however, were apparent between students classified as moderately directed and not directed.

Table 14. Institutional retention odds ratios for 2003–04 beginning community college students in the 4-year transfer track and AA track: 2006

Independent variables	4-year transfer track		AA track	
	Odds ratio[1]	Wald F-statistic[2]	Odds ratio[1]	Wald F-statistic[2]
Intercept	2.543 *	7.194 (20, 181, 0)	1.103	6.139 (20, 181, 0)
Community college track		8.607 (1, 200, 0.004)		20.124 (1, 200, 0)
Strongly directed[3]	1.383 *		2.028 *	
Moderately directed[4]	†		†	
Gender		11.473 (1, 200, 0.001)		0.041 (1, 200, 0.84)
Male	0.671 *		0.968	
Female	†		†	
Race/ethnicity		1.581 (4, 197, 0.181)		3.427 (4, 197, 0.01)
Black	0.796		0.578 *	
Hispanic	1.166		0.770	
Asian	1.361		1.998	
Multiple and all others	0.845		1.240	
White	†		†	
Age group as of 12/31/03		4.265 (4, 197, 0.002)		2.155 (4, 197, 0.076)
19	0.957		0.957	
20–23	0.607 *		0.839	
24–29	0.603 *		0.605	
30 or older	0.604 *		0.659 *	
18 or younger	†		†	
Income group 2003–04		0.884 (2, 199, 0.415)		1.904 (2, 199, 0.152)
Low	0.838		0.785	
High	1.011		1.218	
Middle	†		†	
First Pell Grant		9.738 (2, 199, 0)		6.848 (2, 199, 0.001)
Pell Grant in first year	0.922		1.235	
Pell Grant in later year	2.425 *		2.887 *	
No Pell Grant	†		†	
Parent's highest education level 2003–04		6.566 (2, 199, 0.002)		0.485 (2, 199, 0.616)
High school or less	0.641 *		0.809	
Some postsecondary education	0.746 *		0.904	
Bachelor's degree or higher	†		†	
Remedial mathematics in 2003–04		6.843 (1, 200, 0.01)		2.068 (1, 200, 0.152)
Yes	0.730 *		0.810	
No	†		†	

See notes at end of table.

Table 14. Institutional retention odds ratios for 2003–04 beginning community college students in the 4-year transfer track and AA track: 2006—Continued

Independent variables	4-year transfer track		AA track	
	Odds ratio[1]	Wald F-statistic[2]	Odds ratio[1]	Wald F-statistic[2]
Hours worked/week while enrolled 2003–04		5.011 (2, 199, 0.008)		4.246 (2, 199, 0.016)
None	1.149		1.009	
Full-time (35 or more)	0.7 *		0.684 *	
Part-time	†		†	
Attendance intensity 2003–04		7.513 (1, 200, 0.007)		6.892 (1, 200, 0.009)
Part-time	0.709 *		0.683 *	
Exclusively full-time	†		†	

† Comparison group.

* $p < .05$.

[1] The three pseudo R-squared statistics for the logistic regression model for the 4-year transfer track are the negative log likelihood, 0.06; the Cox-Snell likelihood ratio, 0.079 (maximum = 0.747); and the Estrella likelihood ratio, 0.081; for students in the AA track, the negative log likelihood, 0.077; the Cox-Snell likelihood ratio, 0.101 (maximum = 0.746); and the Estrella likelihood ratio, 0.104.

[2] The Wald F for the intercept is a test of the overall model; the Wald F for each independent variable is displayed in the table; and the numbers in parentheses are the numerator and denominator degrees of freedom and associated *p*-value.

[3] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[4] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

NOTE: Comparison group is in italics. Institutional retention is defined as maintaining enrollment, attaining a degree or certificate, or transferring to a 4-year institution from the first institution attended.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Results for first-year attrition were consistent with those for 3-year retention: strongly directed students were less likely than moderately directed students to leave in their first year, while no difference was observed between those classified as moderately directed and not directed (table 15).

Analysis of enrollment continuity, on the other hand, showed a difference between students classified as moderately directed and not directed, but not between the strongly directed and moderately directed groups (table 15). The odds of stopping out for students classified as not directed were roughly double those for moderately directed students.

In summary, after controlling for interrelated factors, students who met the criteria for being classified as strongly directed to program completion had higher odds of institutional retention and lower odds of first-year attrition than did their peers who were classified as moderately directed. In addition, moderately directed students demonstrated stronger enrollment continuity than those classified as not directed.

Table 15. First-year attrition odds ratios for 2003–04 beginning community college students, and among students who persisted to their third year, odds ratios for stopping out (taking a break of 5 or more months) and corresponding F-statistics: 2006

Independent variables	Left in first year		Ever stopped out among persisters	
	Odds ratio[1]	Wald F-statistic[2]	Odds ratio[1]	Wald F-statistic[2]
Intercept	0.132 *	11.77 (21, 180, 0)	0.411 *	2.481 (21, 180, 0.001)
Community college track		14.665 (2, 199, 0)		4.602 (2, 199, 0.011)
Strongly directed[3]	0.639 *		0.839	
Not directed[4]	1.320		2.324 *	
Moderately directed[5]	†		†	
Gender		9.881 (1, 200, 0.002)		6.811 (1, 200, 0.01)
Male	1.444 *		1.524 *	
Female	†		†	
Race/ethnicity		1.094 (4, 197, 0.361)		0.995 (4, 197, 0.412)
Black	1.136		1.070	
Hispanic	0.801		1.057	
Asian	0.642		0.730	
Multiple and all others	1.010		1.547	
White	†		†	
Age group as of 12/31/03		8.461 (4, 197, 0)		2.981 (4, 197, 0.02)
19	1.136		1.147	
20–23	1.737 *		1.624 *	
24–29	2.147 *		2.206 *	
30 or older	2.204 *		1.254	
18 or younger	†		†	
Income group 2003–04		2.741 (2, 199, 0.067)		0.154 (2, 199, 0.857)
Low	1.359 *		1.104	
High	1.037		1.016	
Middle	†		†	
First Pell Grant		11.816 (2, 199, 0)		0.45 (2, 199, 0.638)
Pell Grant in first year	0.612 *		0.940	
Pell Grant in later year	0.077		1.190	
No Pell Grant	†		†	
Parent's highest education level 2003–04		7.329 (2, 199, 0.001)		0.131 (2, 199, 0.877)
High school or less	1.507 *		0.975	
Some postsecondary education	1.427 *		1.067	
Bachelor's degree or higher	†		†	
Remedial mathematics in 2003–04		0.207 (1, 200, 0.65)		0.475 (1, 200, 0.492)
Yes	0.949		0.912	
No	†		†	

See notes at end of table.

Table 15. First-year attrition odds ratios for 2003–04 beginning community college students, and among students who persisted to their third year, odds ratios for stopping out (taking a break of 5 or more months) and corresponding F-statistics: 2006—Continued

Independent variables	Left in first year		Ever stopped out among persisters	
	Odds ratio[1]	Wald F-statistic[2]	Odds ratio[1]	Wald F-statistic[2]
Hours worked/week while enrolled 2003–04		3.582 (2, 199, 0.03)		3.869 (2, 199, 0.022)
None	1.151		0.637 *	
Full-time (35 or more)	1.409 *		0.916	
Part-time	†		†	
Attendance intensity 2003–04		12.312 (1, 200, 0.001)		0.031 (1, 200, 0.861)
Part-time	1.494 *		1.033	
Exclusively full-time	†		†	

† Not applicable or comparison group.

* $p < .05$.

[1] The three pseudo R-squared statistics for the logistic regression model for first-year attrition are the negative log likelihood, 0.036; the Cox-Snell likelihood ratio, 0.046 (maximum = .736); and the Estrella likelihood ratio, 0.046; for stopouts, the negative log likelihood, 0.106; the Cox-Snell likelihood ratio, 0.116 (maximum = 0.665); and the Estrella likelihood ratio, 0.116.

[2] The Wald F for the intercept is a test of the overall model; the Wald F for each independent variable is displayed in the table; and the numbers in parentheses are the numerator and denominator degrees of freedom and associated *p*-value.

[3] Reported intentions to complete program, enrolled in formal degree program in first term (if AA or certificate track), *and* attended at least half time in first year.

[4] Did not meet all three "strongly directed" criteria, but reported intentions to complete *or* enrolled in formal degree program in first term.

[5] Did not report intentions to complete *and* was not enrolled in formal degree program in first term.

NOTE: Comparison group is in italics.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

Student Characteristics and Other Factors Related to Outcomes

Retention rates varied by gender and race/ethnicity in the multivariate analyses, but the patterns differed among subgroups. For example, after controlling for interrelated factors, the odds of 3-year retention were higher for women than for men, both overall and among younger students (under age 24), but not among older students (table 13-A and 13-B). Similarly, a gender difference in retention was observed for students in the 4-year transfer track, but not for those in the AA track (table 14).

Results for race/ethnicity indicated that the odds of being retained were significantly lower for Black students than for White students overall and for students age 24 or older, but not for younger students (tables 13-A and 13-B). Among the younger

students, however, the odds of being retained were higher for Asian students than for White students.[7]

Age was associated with all the three outcomes examined (tables 14 and 15). With one exception, students 18 or younger exhibited higher odds of being retained, and lower odds of first year attrition and stopping out than their peers 20 or older. The exception was among AA track students, for whom only students 30 or older had lower odds of retention than those 18 or younger.

One difference by income levels was statistically significant: the odds of leaving in the first year were higher for low-income than for middle-income students. In contrast, a number of differences by parents' education levels were observed. Students' odds of being retained were higher if they had a parent who had attained at least a bachelor's degree than if they did not. As was observed for gender, these differences held for younger students and for students in the 4-year transfer track, but not for older students or for those in the AA track.

Receiving a Pell Grant in the first year of enrollment was not significantly associated with 3-year institutional retention rates.[8] However, first-year Pell Grant recipients exhibited lower odds of leaving in the first year.

Students who were less prepared for college, as demonstrated by their participation in remedial mathematics courses, had lower odds of retention after 3 years than those who were more prepared. This result held for all students, younger students, and those in the 4-year transfer track, but not for older students or those in the AA track. However, remedial math participation was not associated with enrollment continuity or first-year attrition. Higher levels of academic preparation, as measured by completing high school courses beyond algebra 2 (only reported by students under age 24), were also associated with higher odds of being retained.

With few exceptions, full-time enrollment and employment intensity were consistently associated with all three outcomes analyzed. Students who attended full time in their first year experienced higher odds of being retained than did students who attended part time, and this result held for all subgroups analyzed except older students. Full-time enrollment, however, was not associated with enrollment

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[7] There were fewer than 30 Asian students among students 24 or older so they were removed from the analysis.

[8] Note that students who received a Pell Grant in later years would be expected to achieve higher rates of retention because by definition they have been retained beyond their first year. They are included in the model separately so as not to confound the difference between receiving the grant in the first year and never receiving it.

continuity. That is, those who attended full time did not exhibit lower odds of stopping out than did those who attended part time.

Finally, full-time employment in the first year of enrollment was associated with all three outcomes and for all subgroups of students: those who worked full time while enrolled in their first year exhibited lower odds of being retained, higher odds leaving in their first year, and higher odds of stopping out than did those who worked part time.

In summary, after controlling for interrelated factors, all of the independent variables included in the logistic regression analyses were associated with at least one of the three outcomes analyzed. When all of the variables were held constant, students in the strongly directed CCT classification exhibited higher odds of retention and lower odds of first-year attrition and stopping out than their peers classified as moderately directed.

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Summary and Conclusions

Three years after enrolling in a community college, roughly half of all beginning community college students were either still enrolled or had completed a program of study by obtaining a degree or certificate or by transferring to another institution. Some 49 percent had maintained their enrollment or completed a program of study at their first institution, and 55 percent had persisted in any postsecondary institution. One-in-10 beginning community college students had earned an AA degree, 1-in-20 had completed a vocational certificate, and nearly 1-in-5 had transferred to another institution—11 percent to a 4-year college and 8 percent to another sub-baccalaureate institution. About one-fourth (23 percent) of beginning community college students had left school in their first year and had not returned within the 3-year study period.

The Community College Taxonomy classifications were consistently associated with students' 3-year outcomes. In particular, students who met the criteria for being classified as strongly directed because they reported intentions to complete a program of study, attended at least half time in their first year, and were enrolled in a formal degree or certificate program achieved higher rates of institutional retention, student persistence, AA attainment, and 4-year transfer than their counterparts who did not meet the criteria. These results held overall and within the 4-year transfer and AA degree tracks, though not among the small percentage of students in the certificate track. While strongly directed students were younger on average than their moderately directed peers, logistic regression analysis of students age 24 or older also indicated that strongly directed students exhibited higher odds of institutional retention than their moderately directed counterparts.

Strongly directed students are analogous to the students Adelman (2005) characterizes as persistent groups oriented toward transfer or degree completion. These students comprise a majority of first-time community college students (56 percent) and had demonstrated intentions, through their expressed goals and coursetaking, of finishing a course of study. A majority—57 percent—of strongly directed students had been retained after 3 years, a significantly higher percentage than that of all students (49 percent).

Moderately directed students demonstrated stronger enrollment continuity than their peers who were not directed. That is, among students who had persisted, students without obvious intentions to complete had stopped out at a higher rate than

students designated as moderately directed. However, in contrast to the institutional retention and student persistence findings, enrollment continuity was not measurably different between the strongly directed and moderately directed groups.

While transfer rates were generally higher for students in the 4-year transfer track, transfer also occurred among students who originally indicated plans for AA completion at the institution in which they first enrolled. For these AA degree-seeking students, the moderately directed transfers made the transition to another 2-year institution at a higher rate than to a 4-year institution, while the strongly directed transfers were evenly split between 2-year and 4-year institutions.

Finally, approximately 6 percent of beginning community college students fell into the not directed classification. Among such students, some 42 percent had persisted for 3 years. Even though these students did not report intentions to complete a program of study when they first enrolled, 12 percent had either earned a credential or had transferred to a 4-year institution.

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Appendix A—Glossary

This glossary describes the variables used in this report. The glossary index below lists variables in the order they appear in the report. The glossary entries are in alphabetical order by variable name (right-hand column).

Glossary Index

Attainment and transfer

Highest degree attained at first institution 2006 ..... ATHTYF3Y
First transfer origin and destination TFINLV3Y
First transfer timing TFTYPE3Y

Reasons for leaving

Reasons for leaving postsecondary education as of 2004:
- Academic problems RLV04A
- Scheduling problems RLV04B
- Dissatisfaction with program RLV04C
- Financial reasons RLV04D
- Family reasons RLV04E
- Personal reasons RLV04F
- Finished desired classes RLV04G
- Other RLV04X

Reasons for leaving postsecondary education as of 2006:
- Academic problems RLV06A
- Scheduling problems RLV06B
- Dissatisfaction with program RLV06C
- Financial reasons RLV06D
- Family reasons RLV06E
- Personal reasons RLV06F
- Finished desired classes RLV06G
- Called for military service RLV06H
- Other RLV06X

Weight

BPS final analysis weight WTA000

DAS VARIABLE

Average age as of 12/31/03 **AGE**
Student's age as of 12/31/2003. Used for determining average age.

Age groups as of 12/31/03 **AGEGROUP**
Indicates the age group the student was in as of 12/31/03.

18 or younger
19
20–23
24–29
30 or older

Highest degree attained at first institution 2006 **ATHTYF3Y**
Highest degree attained at the first institution attended through June 2006.

No degree
Certificate
Associate's degree
Bachelor's degree

Reason for enrolling in first institution 2004
Indicates answer to the question, "What were your main reasons for enrolling at [institution NAME]?" Institution name is the first institution attended. Question was asked of students who enrolled at a less-than-4-year institution or were not working on a degree.

Complete an associate's degree **ATTENDA**
Complete certificate **ATTENDB**
Transfer to a 4-year college **ATTENDF**

Attendance intensity in 2003–04 **ATTNPT**
Indicates the student's attendance intensity during 2003–04 academic year. For students enrolled in clock-hour programs, their enrollment is converted to full-time/part-time status.

Attended full time
Attended part time, half time or more
Attended less than half time

Community college student 3-year retention status 2006 **CCSTAT3Y**
Student 3-year retention status at first community college at the end of academic year 2005–06. The cut-off date for classification is March 2006. Students' status is relative to their first institution; therefore, the "Enrolled" categories indicate that students are still enrolled at their first institution. It is possible that students classified as transferred may no longer be enrolled. DAS users can determine their current enrollment status by crossing the variable with PRAT3Y (persistence and attainment anywhere). The variable was used to determine the first community college 3-year retention rate by combining the attained, still enrolled, and transferred to 4-year institution categories.

DAS VARIABLE

Community college student 3-year retention status 2006—continued **CCSTAT3Y**

First institution is not public 2-year
Not enrolled, no degree
Not enrolled, attained associate's degree
Not enrolled, attained certificate
Enrolled, no degree
Enrolled, attained associate's degree
Enrolled, attained certificate
Transferred to 2-year or less (with or without degree)
Transferred to 4-year without associate's degree
Transferred to 4-year with associate's degree

Community college taxonomy **CCTRACK**

A taxonomy of community college students based on how directed they are toward completing a specific program of study: "strongly directed," "moderately directed," and "not directed." Students were classified as "strongly directed" if they attended college at least half time during the months they were enrolled in their first year of enrollment (regardless of how many), reported that transferring to a 4-year institution or completing an associate's degree or vocational certificate were reasons for enrolling, and were enrolled in a formal degree program if they were AA degree or certificate seekers (4-year transfer seekers were not required to be in a formal degree program). If students did not meet these criteria, but were enrolled in a formal degree program or reported intentions to complete a degree, certificate, or 4-year transfer, they were classified as "moderately directed." The remaining students were classified as "not directed" (i.e., they were not enrolled in a formal degree program and did not report completion intentions). Students were separated into their respective degree programs. If students reported 4-year transfer and AA or certificate completion as reasons for enrolling, they were placed in the 4-year transfer group.

Strongly directed
  4-year transfer
  AA degree
  Certificate
Moderately directed
  4-year transfer
  AA degree
  Certificate
Not directed

Year-to-year attrition (last academic year with no attainment) through 2006 **ENLYAT3Y**

Last academic year enrolled anywhere without degree completion through 2006. Indicates whether the respondents had attained a certificate or degree at any postsecondary institution by June 2006; if not, when they were last enrolled at any postsecondary institutions. For academic year 2005–06, respondents were considered to be last enrolled in the fall if they were last enrolled in December 2005 or before; otherwise, they were considered to be last enrolled in spring 2006.

No degree, last enrolled in 2003–04
No degree, last enrolled in 2004–05
No degree, last enrolled in 2005 fall
No degree, last enrolled in 2006 spring

DAS VARIABLE

Gender **GENDER**
Indicates the student's gender.

Male
Female

Highest level mathematics course completed in high school **HCMATH**
Highest level of math completed or planned to take, according to self-report on standardized test questionnaire and the student interview. For a number of students, both College Board and ACT score reports were available. In these cases, high school grade and curriculum information from the more recent test date was used.

None of these
Algebra 2
Trigonometry
Pre-calculus
Calculus

Income group in 2003–04 **INCGRP**
Indicates the income group of the student, based on total income in 2002 for independent students or parents of dependent students.[1] Income groups were determined separately for dependent and independent students based on percentile rankings and then combined into one variable. Income breakpoints are reported below. For definition of income at or below poverty, see PCTPOV.

Low (lowest 25 percent)
Middle (middle 50 percent)
High (highest 25 percent)

Dependent students' family income levels
Low (less than $32,000)
Middle two groups ($32,000 to < $60,000 and $60,000 to < $92,000)
High ($92,000 or more)

Independent students' income levels
Low (less than $12,000)
Middle two groups ($12,000 to < $27,000 and $27,000 to < $52,000)
High ($52,000 or more)

[1] Students are considered to be financially independent of their parents for federal financial aid purposes if they are age 24 or older on 12/31 in the year they enroll, or if they meet any of the following criteria in the same year: are married; have legal dependents; are veterans of the U.S. armed forces or on active duty; are orphans or wards of the court; or are enrolled in a graduate or first-professional degree program (beyond the bachelor's degree). All other students under 24 were considered to be dependent unless they could document that they were receiving no parental support and were determined to be independent by a financial aid officer using professional judgment.

DAS VARIABLE

Hours worked per week while enrolled 2003–04 **JOBHOUR2**
Average hours the student worked per week during 2003–04 academic year (including work-study/assistantship/traineeship).

Parents' highest education level 2003–04 **PAREDUC**
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 or less	Neither parent earned more than a high school diploma or equivalent or did not complete high school.
Some college	At least one parent received some postsecondary education, but did not earn a bachelor's degree.
Bachelor's degree or higher	At least one parent attained a bachelor's or advanced degree.

Income at or below poverty level 2003–04 **PCTPOV**
Indicates students whose family income was 125 percent or less of the 2002 federal poverty line. This variable was based on family size and income of the parents of dependent students, or the student's own family if independent.

Pell Grant received in first year **PELFRSTY**
First academic year that a Pell Grant was received.

No Pell Grant
Academic year 2003–04
Academic year 2004–05
Academic year 2005–06

Persistence and attainment anywhere 2006 **PRAT3Y**
Indicates whether the student had attained any certificate or degree and/or was still enrolled at any postsecondary institution as of June 2006. Students enrolled in any months after January 2006 were considered to be still enrolled through June 2006. Those who attained a certificate or associate's degree at any time before July 2006, including those who attained between February and June 2006, are classified as "Attained, still enrolled." However, students who attained a bachelor's degree by June 2006 were classified as "Attained, not enrolled." Derived from monthly enrollment indicators and degree dates.

Attained degree, still enrolled in 2006
Attained degree, not enrolled in 2006
No degree, still enrolled in 2006
No degree, not enrolled anywhere in 2006

DAS VARIABLE

Race/ethnicity **RACE**

Indicates the student's race/ethnicity with Hispanic or Latino origin as a separate category. Based on the census race categories. All of the race categories exclude Hispanic origin unless specified.

White	A person having origins in any of the original peoples of Europe, North Africa, or the Middle East.
Black	A person having origins in any of the black racial groups of Africa. Includes African American.
Hispanic	A person of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin. Includes Latino.
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, the Philippine Islands, India, and Vietnam. Pacific Islander is a person having origins in the Pacific Islands, including Hawaii and Samoa.
American Indian or 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.
Other	A person having origins in more than one race or in a race not listed above.

Remedial mathematics taken in 2003–04 **REMEDIB**

Indicates whether student took remedial math course during 2003–04 academic year.

Reasons for leaving postsecondary education as of 2004

Indicates answer to the question, "You indicated earlier that you are no longer enrolled at [institution]. Why did you decide to leave [institution]? (Please check all that apply.)" Applies to students who were not currently enrolled, left institution before the term ended, did not transfer, did not plan to transfer, and did not plan on being enrolled in 2004–05.

Academic problems **RLV04A**
Scheduling problems **RLV04B**
Dissatisfaction with program **RLV04C**
Financial reasons **RLV04D**
Family reasons **RLV04E**
Personal reasons **RLV04F**
Finished desired classes **RLV04G**
Other **RLV04X**

DAS VARIABLE

Reasons for leaving postsecondary education as of 2006
Indicates answer to the question, "You indicated earlier that you are no longer enrolled at [institution]. Why did you decide to leave [institution]? (Please check all that apply.)" Applies to students who were not currently enrolled, left institution before the term ended, did not transfer, did not plan to transfer, and did not plan on being enrolled in 2006–07.

Academic problems	**RLV06A**
Scheduling problems	**RLV06B**
Dissatisfaction with program	**RLV06C**
Financial reasons	**RLV06D**
Family reasons	**RLV06E**
Personal reasons	**RLV06F**
Finished desired classes	**RLV06G**
Called for military service	**RLV06H**
Other	**RLV06X**

First institution attended in 2003–04 **SECTOR9**
Type of the institution attended during the 2003–04 academic year. Variable was used to define the analysis sample: SECTOR9=1 (Public 2-year).

Public less-than-2-year
Public 2-year
Public 4-year non-doctorate-granting
Public 4-year doctorate-granting
Private not-for-profit less-than-4-year
Private not-for-profit 4-year non-doctorate-granting
Private not-for-profit 4-year doctorate-granting
Private for-profit less-than-2-year
Private for-profit 2-year or more

Enrollment continuity, enrollment spells number through 2006 **SENUM3Y**
Number of enrollment spells through June 2006 used to identify stopouts. An enrollment spell is defined as a period of enrollment (in one or more institutions) without a break of 5 or more months. A student with more than one enrollment spell had stopped out.

Stafford loan received in first year **STFIRSTY**
Indicates the first academic year respondent received a Stafford loan. Used to identify students who borrowed in their first year of enrollment.

No Stafford loan
Spring 2003
Academic year 2003–04
Academic year 2004–05
Academic year 2005–06

DAS VARIABLE

First transfer origin and destination **TFINLV3Y**
Transfer institution, origin, and destination attended as of 2006. The three transfer categories were aggregated to get percentage ever transferred.

Never transferred
2-year to 4-year
2-year to 2-year
2-year to less-than-2-year

First transfer timing **TFTYPE3Y**
Types of first transfer. Transfer categories were aggregated to determine percentage ever transferred. Immediate transfer occurs within 4 or fewer months; otherwise, the transfer is delayed. Upward transfer indicates a transfer from 2-year to 4-year institution; lateral transfer is from 2-year to 2-year and downward transfer is from 2-year to less-than-2-year institution.

Never transferred
Immediate, upward transfer
Immediate, lateral transfer
Immediate, downward transfer
Delayed, upward transfer
Delayed, lateral transfer
Delayed, downward transfer

Plans to transfer to 4-year institution **TR4PLNY1**
Student's plans to transfer to a 4-year institution in 2003–04. Composite based primarily on the 2004 interview question about reasons for enrolling at the NPSAS sample school (ATTENDF) and plans to transfer in order to pursue a bachelor's degree (NPSAS:04 CATI variable N4TRNRD, not included in the DAS).

Degree program 2003–04 **UGDEG**
Undergraduate student's degree program during the 2003–04 academic year. Based primarily on the 2004 interview question, "What degree were you working on at [institution]?" For non-respondents, the degree program reported by the NPSAS institution or reported by the student in the Central Processing System (CPS) was used.

Certificate
Associate's degree
Bachelor's degree
No undergraduate degree

BPS final analysis weight **WTA000**
Study weight for all students.

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Appendix B—Technical Notes and Methodology

Beginning Postsecondary Students Longitudinal Study

The 2004/06 Beginning Postsecondary Students Longitudinal Study (BPS:04/06) is sponsored by the U.S. Department of Education to respond to the need for a national, comprehensive database concerning issues students may face in enrollment, persistence, progress, and attainment in postsecondary education and in consequent early rates of return to society (Berkner and Choy 2008). The BPS study follows the paths of first-time beginning (FTB) students for a number of years as they navigate the system of postsecondary education and captures transfer patterns, co-enrollment, and periods of nonenrollment (stopouts).

Unlike the typical retention and attainment studies that follow entering freshmen at a single institution, BPS:04/06 follows students throughout all their enrollments, thus providing systemwide measures of student persistence. BPS:04/06 also represents a departure from previous longitudinal studies of high school age cohorts by starting with a cohort of all students beginning their postsecondary studies, regardless of when they completed high school. Consequently, BPS:04/06 data include information about older postsecondary students who have delayed continuing their education after high school due to military service, family responsibilities, or other reasons.

BPS:04/06 is a follow-up to the 2003–04 National Postsecondary Student Aid Study (NPSAS:04), a recurring survey of a nationally representative, cross-sectional sample of postsecondary students. The NPSAS surveys have been implemented every 3 or 4 years since 1986–87, and the data for the most recent survey (for the 2003–04 school year) were released in early 2005. BPS:04/06 represents the first follow-up of the NPSAS:04 FTB students. An additional follow-up interview will occur in 2009.

The BPS:04/06 data collection effort involved interviews of both respondents and nonrespondents to the NPSAS:04 study. The interview took place in one of three modes: self-administered through a web-based instrument, interviewer-administered via computer-assisted telephone interviewing (CATI), or interviewer-administered in person via computer-assisted personal interviewing (CAPI). A single web-based instrument was used for all administration modes.

Student Universe for BPS:04/06

Students eligible for the BPS:04/06 full-scale study were participants in NPSAS:04 who were identified as FTB students at the NPSAS sample institutions in the 2003–04 academic year. Consistent with previous NPSAS studies, the students eligible for the NPSAS:04 full-scale study were those enrolled in eligible institutions and who satisfied all the following eligibility requirements:

- were enrolled in *either* (1) an academic program; (2) at least one course for credit that could be applied toward fulfilling the requirements for an academic degree; *or* (3) an occupational or vocational program that required at least 3 months or 300 clock hours of instruction to receive a degree, certificate, or other formal award; and
- were *not* concurrently or solely enrolled in high school, a General Educational Development (GED), or other high school completion program.

NPSAS-eligible students who enrolled in a postsecondary institution for the first time during the NPSAS year (July 1, 2003–June 30, 2004) after completing high school were considered eligible for BPS:04/06. Student interviews took place on a flow basis between March and August 2004. For more detailed information about the NPSAS and BPS studies, see Cominole et al. (2006) and Berkner et al. (2007).

Institution-Level Response Rates and Bias Analysis

Of the 1,630 eligible NPSAS:04 sample institutions, 1,360 were respondents (84 unweighted percent and 80 weighted percent). The institution weighted response rate is below 85 percent for six of the nine types of institutions. The weighted response rates by type of institution range from 70 percent for public 4-year non-doctorate-granting institutions to 93 percent for private not-for-profit less-than-4-year institutions. The unweighted response rate for public 2-year institutions, which this report is based on, was 85.4 percent, and the weighted response rate was 77.6 percent.

A nonresponse bias analysis was conducted for all institutions and for the six institution types with a weighted response rate below 85 percent. The nonresponse bias was estimated for variables known (i.e., nonmissing) for most respondents and nonrespondents. Extensive data from the Integrated Postsecondary Education Data System (IPEDS) are available for all institutions.

For the institution-level variables, first, the nonresponse bias was estimated and tested to determine if the bias was significant at the 5 percent level. Second,

nonresponse adjustments were computed, and the variables were included in the nonresponse models. The nonresponse adjustments were designed to significantly reduce or eliminate nonresponse bias for variables included in the models. Third, after the weights were computed, any remaining bias was estimated for the variables listed above, and statistical tests were performed to check the remaining significant nonresponse bias.

The results varied by type of institution. Before weighting, bias for public 2-year institutions was found for 7 percent of the variable categories. After the weighting adjustment, no significant bias remained.

Student-Level Bias Analysis

Of the 18,640 eligible sample students, 14,900 responded, resulting in an unweighted response rate of 80 percent and a weighted response rate of 77 percent. Since these rates are less than 85 percent, a nonresponse bias analysis was conducted. The nonresponse bias was estimated and tested (adjusting for multiple comparisons) to determine if the bias was significant at the 5 percent level. This bias analysis was conducted for the entire sample and for each of the institutional strata. In general, the relative bias was generally very small.

For the total BPS:04 cohort, approximately 45 percent of the variables had statistically significant bias, but the mean and median relative bias was low: less than 3 percent. The percentage of variables with statistically significant bias varied from 0 to 22 percent, by type of institution. For public 2-year institutions, no significant bias was found.

Item-Level Bias Analysis

All items with missing data in the BPS study were imputed. A byproduct of the imputation is the reduction or elimination of item-level nonresponse bias. Imputation reduces or eliminates nonresponse bias by replacing missing data with statistically reasonable values, which produces imputed sample distributions that resemble full population distributions. The use of carefully constructed imputation classes, donor-imputee matching criteria, and random hot-deck searches within imputation cells are all designed to ensure that imputed data are reasonable and that the nonresponse bias can be ignored within the imputation classes.

Perturbation

To protect the confidentiality of NCES data that contain information about specific individuals, BPS:04/06 data were subject to perturbation procedures to minimize

disclosure risk. Perturbation procedures, which have been approved by the NCES Disclosure Review Board, preserve the central tendency estimates but may result in slight increases in nonsampling errors.

Weighting

All estimates in this report are weighted to represent the target population. The weights compensate for the unequal probability of selection of institutions and students in the NPSAS:04 sample. The weights also adjust for multiplicity at the institution and student levels and unknown student eligibility for NPSAS. Because the students in the BPS:04/06 sample are a subset of the NPSAS:04 sample, the BPS weights were derived from the NPSAS weights. The weights were not adjusted for BPS:04/06 nonresponse because the BPS:04/06 data file contains BPS:04/06 nonrespondents with imputed data as well as BPS:04/06 respondents. Logistic regression models for predicting BPS:04/06 eligibility were developed using the BPS:04/06 respondents and the variables available for the BPS:04/06 frame construction; these models were then used to predict eligibility for the BPS:04/06 nonrespondents. The BPS:04/06 nonrespondents predicted to be eligible were included on the data file with imputed data.

Community College Taxonomy Development

In developing the Community College Taxonomy (CCT) for BPS students (i.e., first-time freshmen), changes were necessary to accommodate differences in the surveys between BPS and NPSAS. NPSAS included all students enrolled in 2003–04, whereas BPS is a subset of NPSAS, comprising only first-time freshmen. In the NPSAS study, to be designated as directed, students in AA and certificate tracks were required to be enrolled in a formal degree program. However, when students first enroll in a community college, they may not be able to get into over-subscribed programs (such as nursing) in their first term, although they may elect to take related coursework until they are formally admitted. Therefore, even if students were not enrolled in a formal AA or certificate program, if they reported intentions to complete one or the other, they were designated as directed.[1] In addition, because of the smaller sample size of BPS relative to NPSAS, the applied and general AA tracks, which were reported separately in the NPSAS study, were combined into one AA track.

[1] The change increased the moderately directed AA and certificate tracks 2 percentage points each and reduced the not-directed track from 10 to 6 percent. Data not shown.

Finally, the terminology changed. The three classification levels demonstrating how strongly directed students were toward completion (i.e., strongly directed, directed, not directed) were referred to as "commitment." Students were identified as "strongly directed," "directed," or "not directed" using the same criteria. However, based on suggestions by reviewers and because the data do not measure students' personal commitment, the decision was made to change the terminology.

Data Analysis System

The estimates presented in the report were produced using the BPS:04/06 Data Analysis System (DAS), a web-based software application that enables users to generate tables for most of the postsecondary surveys conducted by NCES. The DAS produces the design-adjusted standard errors necessary for testing the statistical significance of differences in the estimates. For example, table B1 displays the standard errors of the estimates in table 1-A. All standard errors for estimates presented in this report can be viewed at http://nces.ed.gov/das/library/reports.asp.

The DAS also contains a detailed description of how each variable was created and includes question wording for items coming directly from an interview. With the DAS, users can replicate or expand upon the tables presented in this report. The

Table B1. Standard errors corresponding to table 1-A: Age distribution as of 12/31/03 among 2003–04 beginning community college students, by Community College Taxonomy: 2006

	Age groups as of 12/31/03					
Community college taxonomy	18 or younger	19	20–23	24–29	30 or older	Average age
Total	**1.45**	**0.78**	**0.86**	**0.66**	**0.95**	**0.23**
Program direction levels						
Strongly directed	1.66	1.05	1.09	0.82	0.80	0.19
Moderately directed	1.67	1.11	1.20	0.97	1.69	0.38
Not directed	3.08	3.40	2.46	2.56	4.54	1.19
Program track and direction levels						
4-year transfer track						
Strongly directed	1.94	1.21	1.26	0.97	0.77	0.18
Moderately directed	2.78	1.82	1.95	1.15	2.10	0.53
AA track						
Strongly directed	2.10	2.25	1.79	1.24	1.88	0.41
Moderately directed	1.71	1.31	1.52	1.50	2.43	0.55
Certificate track						
Strongly directed	2.28	3.17	3.82	5.14	4.19	0.85
Moderately directed	1.89	2.80	2.92	3.62	4.37	0.93

SOURCE: U.S. Department of Education, National Center for Education Statistics, 2003/04 Beginning Postsecondary Students Longitudinal Study, First Follow-up (BPS:04/06).

output from the DAS includes the table estimates (e.g., percentages or means), the proper standard errors,[2] and weighted sample sizes for the estimates. If the number of valid cases is too small to produce a reliable estimate (fewer than 30 cases), the DAS prints the message "low-N" instead of the estimate.

In addition to tables, DAS users may conduct covariance analyses, either with Weighted Least Squares or Logistic regressions. Many options are available for output with the regression results. For example, a winsor filter can be used to eliminate cases with extreme values by deleting a certain percentage of cases from the top and bottom of the range. For a description of all the options available, users should access the DAS website: http://nces.ed.gov/dasolv2. If users are new to the DAS, the DAS Help Center provides online tutorials offering step-by-step instructions in how to use all the functions of the DAS: http://nces.ed.gov/dasol/help.

The DAS can be accessed electronically at http://nces.ed.gov/DAS. For more information, contact:

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Statistical Procedures

Differences Between Means

The descriptive comparisons were tested using student's *t* statistic. Differences between estimates are tested against the probability of a Type I error, or significance level. The significance levels were determined by calculating the student's *t* values for

[2] The BPS samples are not simple random samples; 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 replication of the sampled population. The procedure used is a bootstrap technique.

the differences between each pair of means or proportions and comparing these with published tables of significance levels for two-tailed hypothesis testing ($p \leq .05$).

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:

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

where *r* is the correlation between the two variables. The denominator in this formula will be at its maximum when the two estimates are perfectly negatively correlated, that is, when $r = -1$. This means that a conservative dependent test may be conducted by using –1 for the correlation in this formula as follows:

$$t = \frac{E_1 - E_2}{\sqrt{(se_1)^2 + (se_2)^2 + 2se_1 se_2}} \quad (3)$$

The estimates and standard errors are obtained from the DAS. If the comparison is between the mean of a subgroup and the mean of the total group, the following formula is used:

$$\frac{E_{sub} - E_{tot}}{\sqrt{se_{sub}^2 + se_{tot}^2 - 2p\, se_{sub}^2}} \quad (4)$$

where *p* is the proportion of the total group contained in the subgroup. 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 1 time out of 20 when there was no actual difference in the quantities in the underlying population. When we test hypotheses that show *t* values at the .05 level or smaller, we treat this finding as rejecting the null hypothesis that there is no difference between the two quantities.

Multivariate Analysis

A number of variables included in this study are interrelated, and to some extent, the patterns of differences found in the bivariate analyses reflect this covariation. To take into account the relationships among variables, multivariate analyses were performed to examine whether differences in outcomes, such as institutional retention and enrollment continuity, were related to the CCT classifications after adjusting for other factors. Logit analysis was used because the outcome variables (e.g., retained or not; stopped out or not) were dichotomous.

Handling of Missing Data

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. The DAS covariance mode uses listwise deletion. In listwise deletion, cases missing on any of the variables included in the regression model are excluded from the analysis.

Interpretation of Multivariate Results

The DAS generates standardized regression coefficients and odds ratios for logit analysis. An odds ratio is the ratio of the odds of an event or condition occurring in one group to the odds of it occurring in another group. Significant odds ratios greater than 1 mean that those in the analysis group are more likely to have the outcome or condition than those in the comparison group. Significant odds ratios less than 1 mean that those in the analysis group are less likely to have that outcome than those in the comparison group.

For example, as shown in table 13-A, the odds ratio for being retained at the first institution was 1.634 for community college students classified as strongly directed to completion. This ratio is interpreted to mean that these students were more likely to be retained than students classified as moderately directed (the comparison group

in italics), even after adjusting for covariation between CCT and such other independent variables as student characteristics and academic preparation indicators.


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