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## ABSTRACT

This report uses the 1990-1994 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994) to examine several ways of estimating the transfer rate from public two-year to four-year institutions. The report focuses on different approaches to defining the pool of potential transfer students or the group of community college students who appear to be planning or hoping to transfer to a four-year institution. The relationship of these definitions of potential transfers to student background characteristics is explored, as is the relationship of each definition to the resulting transfer rate. The report concludes with a discussion of the results in the context of other studies of community college students and transfer. Overall, 71% of beginning community college students responded to a survey that they anticipated earning a bachelor's degree or higher. The majority of students also met three other definitions of potential transfers: (1) being enrolled in an academic program; (2) enrolling continuously in 1989-1990; and (3) enrolling during the 1990-1991 academic year. Less than half the students met another four definitions used in the report, and only 11% had an academic major and were taking courses leading toward a bachelor's degree. In general, transfer rates increased across increasingly restrictive definitions of potential transfers, with the lowest rate (25%) of ever enrolling in a four-year institution found for all beginning community college students compared to 52% among students meeting the most restrictive definition of potential transfers. Three appendixes contain a glossary, technical notes, and supplemental and standard error tables. (Contains 11 tables, 11 figures, and 24 references.) (SLD)

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Research and Development Report

July 2001

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## Community College Transfer Rates to 4-Year Institutions Using Alternative Definitions of Transfer

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**Research and Development Report**

**July 2001**

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## **Community College Transfer Rates to 4-Year Institutions Using Alternative Definitions of Transfer**

Ellen M. Bradburn  
National Center for Education Statistics

David G. Hurst  
Education Statistics Services Institute

Samuel Peng, Project Officer  
National Center for Education Statistics

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# FOREWORD

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The work that produced this report was the result of equal effort on the part of the authors. The order of the authors' names is alphabetical.



# EXECUTIVE SUMMARY

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## Introduction

A large proportion of undergraduates attend public 2-year institutions seeking a wide range of services, from a place to experiment with postsecondary education to a structured vocational certificate or associate's degree program (Grubb 1988, 1991). Although the course offerings and degree programs of many community colleges can accommodate diverse student interests and goals, preparing students to transfer to a 4-year college remains a central characteristic of community colleges (Brint and Karabel 1989). This preparation is key to the community college's role in higher education because it affirms the community college's claim to a collegiate, academic identity and to a role in broadening access for those historically excluded from a college education. Moreover, transfer is a component of most community college students' educational aspirations (Grubb 1991, 195-96).

Despite, or perhaps because of, the importance of transfer from 2- to 4-year institutions, calculating the percentage of community college students who transfer has proven to be somewhat problematic. At first glance, the transfer rate seems relatively unambiguous: it is the number of students who transfer to a 4-year college divided by the number of potential transfer students. However, the numerator and especially the denominator can both be defined in a number of different ways, each having a significant impact on the transfer estimate. The purpose of the present study is to use nationally representative community college data to examine several ways of defining the population of potential transfer students, the relationship of these definitions to student background characteristics, and the relationship of each definition to the resulting transfer rate. This report consists of three sections. The first section describes the dataset used in the analysis and the measurement issues implicated in the study of transfer. The second section presents the selected indicators of the key concepts in the study and the results of the analysis. The report concludes with a discussion of the results in the context of other studies of community college students and transfer.

## Data and Measurement

Although a considerable amount of research has investigated community college transfer rates, many of these analyses have used data that are either limited to a cohort of recent high school graduates, such as the National Education Longitudinal Study of 1988 (NELS:88), or are not nationally representative. This study uses the National Center for Education Statistics (NCES) 1990 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), a nationally representative sample of all students who enrolled in postsecondary education for the first time between July 1, 1989, and June 30, 1990. Follow-up interviews were conducted

in spring 1992 and 1994. BPS is particularly appropriate for the study of community college students because it is representative of all beginning postsecondary students, not just recent high school graduates.

The approach of this report is similar to that used in analyses of individual community colleges or districts, particularly that of Spicer and Armstrong (1996). Holding the numerator constant, variously restrictive definitions of the denominator are employed based on the different approaches to specifying the transfer population found in the literature.

This report defines *transfer* as follows: initial enrollment at a community college followed by subsequent enrollment at any 4-year institution within the 5-year study period. Potential transfer refers to being eligible for transfer or “at risk” of transfer. The broadest definition of *potential transfer* used in this analysis includes all first-time, beginning community college students, although students only taking courses for which they receive no credit are excluded from the BPS sample. The pool of potential transfer students is then restricted using eight additional definitions of the denominator. They are referred to as “increasingly restrictive” because the total proportion of the sample that is included generally decreases, although the more restrictive groups are not necessarily subsets of the less restrictive groups. These definitions were selected to approximate measures commonly used in previous research, from explicit student goals to behaviors often thought to indicate intent to transfer or commitment to postsecondary education. They are as follows:

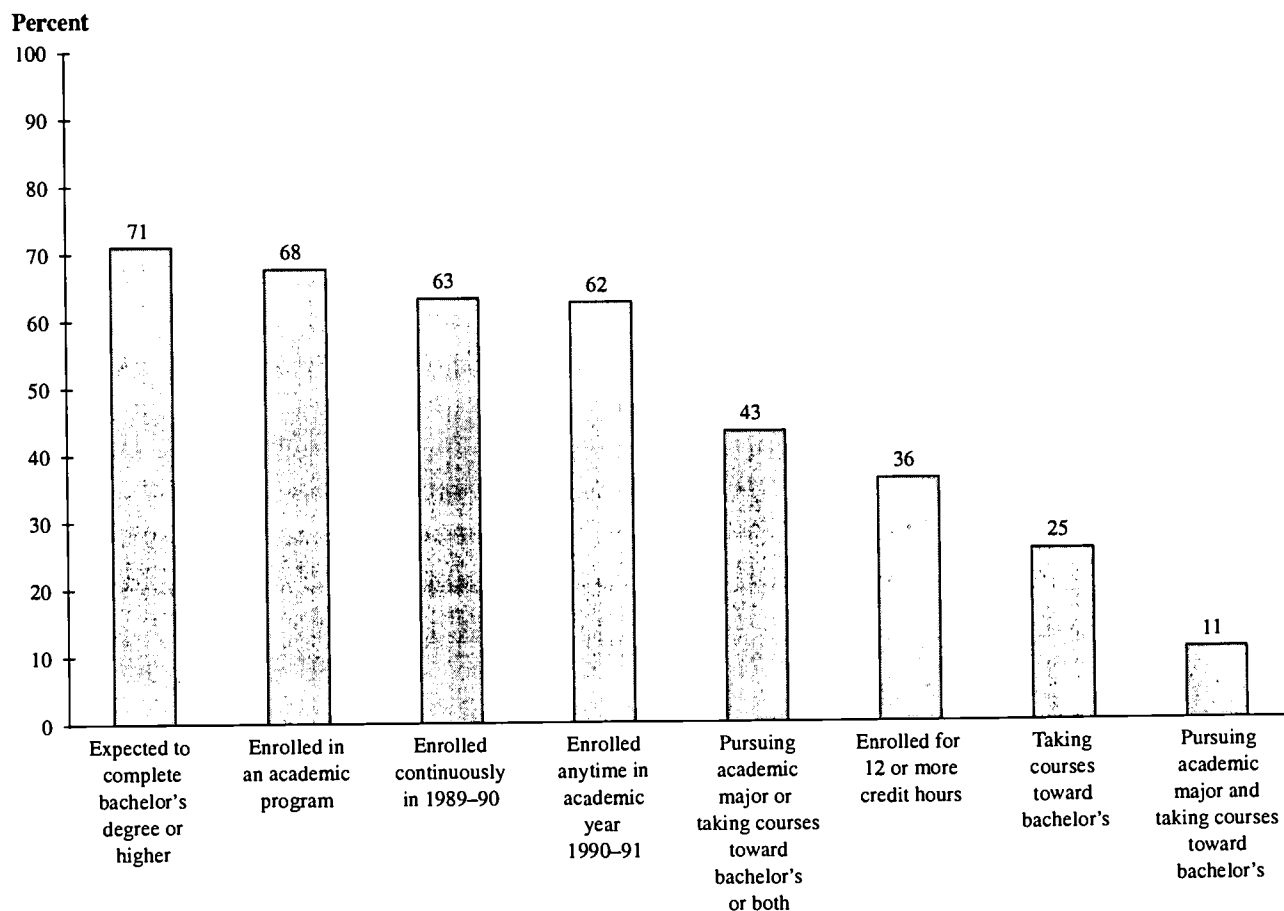
- 1) Expected to complete bachelor’s degree or higher;
- 2) Enrolled in an academic program;
- 3) Enrolled continuously in 1989–90;
- 4) Enrolled anytime in academic year 1990–91;
- 5) Enrolled for 12 or more credit hours;
- 6) Indicated that they were taking courses toward a bachelor’s degree in 1989–90;
- 7) Pursuing academic major or taking courses toward a bachelor’s degree or both; and
- 8) Pursuing academic major *and* taking courses toward a bachelor’s degree.

The analysis begins with estimating the percentage of the 1989–90 cohort of community college students who meet each of these definitions. The relationship of these criteria to various other student characteristics is then explored. The first issue to be examined is whether the composition of the pool of potential transfer students varies as the definition becomes more restrictive. Then, consideration is given to whether different subgroups of students are more or less likely to meet each definition. Finally, a transfer rate is calculated for each group of potential transfer students, and the relationships of these definitions to transfer are explored.

## Results

Overall, 71 percent of beginning community college students responded that they anticipated earning a bachelor's degree or higher when asked, "What is the highest level of education you ever expect to complete?" (figure A). Also, the majority of students were enrolled in an academic program, enrolled continuously in 1989–90, and enrolled during the 1990–91 academic year. Less than half of the students met the other definitions, with 11 percent of the students both having an academic major and taking courses leading toward a bachelor's degree.

**Figure A.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, the percentage of the initial cohort meeting each definition of potential transfer**



NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

***Does the composition of the group of potential transfer students change as the definition becomes more restrictive?***

Restricting the group of potential transfer students according to these definitions may alter the composition of the group, since these educational characteristics are themselves associated with other background variables (Berkner, Cuccaro-Alamin, and McCormick 1996). Across increasingly restrictive definitions of potential transfer, the percentage of the pool that was in the highest socioeconomic status (SES) quartile increased from 30 percent of all beginning postsecondary students to 51 percent of beginning postsecondary students with an academic major taking courses leading toward a bachelor's degree. Furthermore, none of the students in this particular sample who met the most restrictive definition of potential transfer were black, compared to 6 to 10 percent black students in each of the other potential transfer groups.<sup>1</sup> In general, restricting the pool of potential transfer students systematically altered the composition of the group to include more traditional students (younger, dependent students who do not work full time).

***What percentage of students with different characteristics meets each potential transfer definition?***

In addition to examining how the composition of the population of potential transfer students changed as the definitions became more restrictive, the report also compares the likelihood of meeting each definition of potential transfer across various subgroups of students. For example, students 22 years or older were generally less likely than younger students to meet the various definitions of potential transfer. In general, the higher the SES, the higher the percentage of students who met the criteria for each specification. Students who reported taking at least 1 credit hour of remedial mathematics instruction during 1989–90 were generally about as likely to fit each definition as students who did not take any remedial mathematics instruction. Students who were enrolled full time were generally more likely to meet the various specifications than those who were enrolled less than full time.

***Transfer rates for each definition of potential transfer***

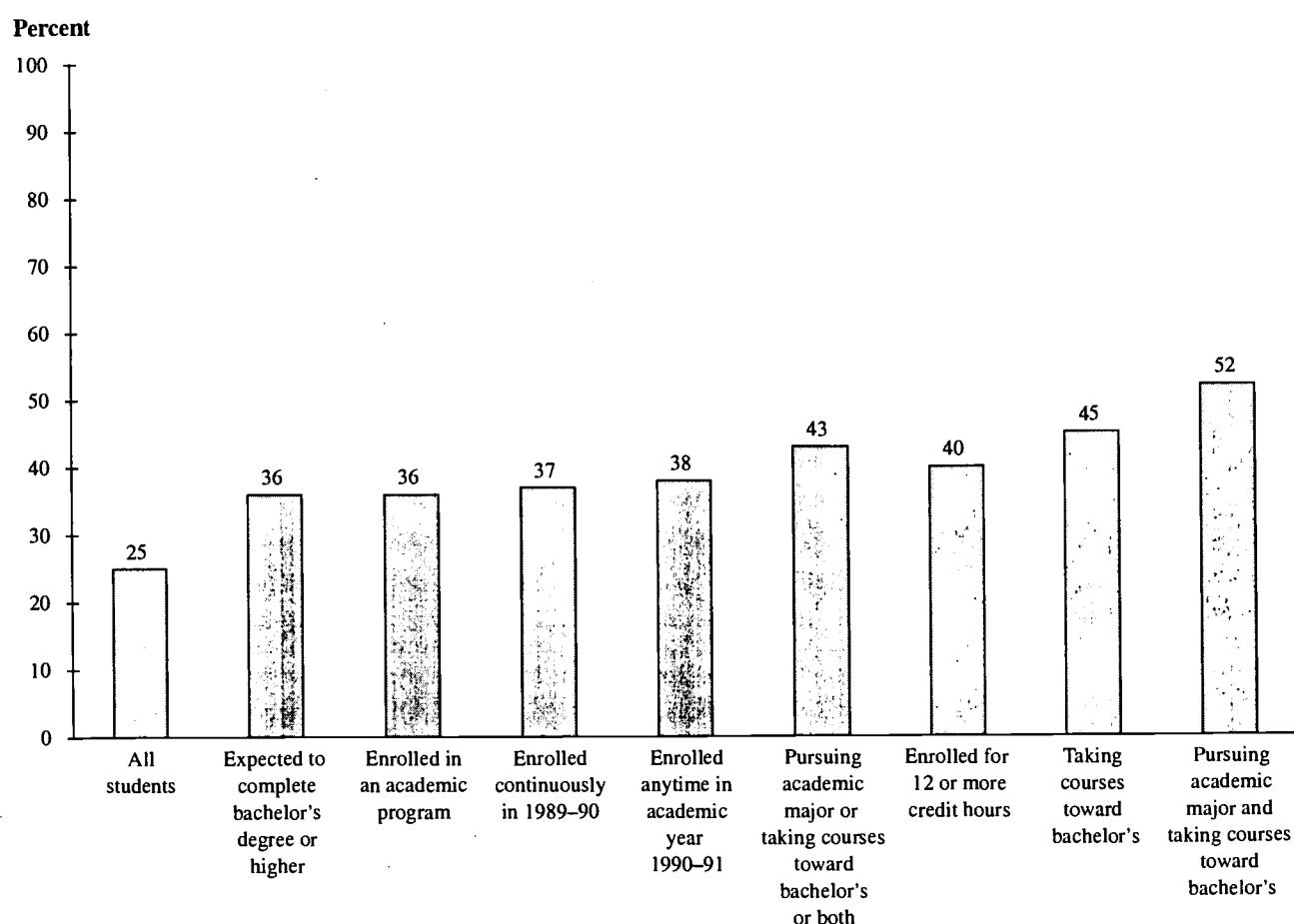
Figure B shows estimated transfer rates for all community college entrants and for the eight increasingly restrictive definitions of potential transfer arranged in order. The results show that, in general, the transfer rate increased for more restrictive definitions. The lowest rate of ever enrolling in a 4-year institution, 25 percent, was found for all beginning community college students, compared to 52 percent for students meeting the most restrictive definition (both pursuing an academic major during 1989–90 and taking courses leading toward a bachelor's degree). That is, the transfer rate for the most restrictive definition was at least

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<sup>1</sup>This does not necessarily mean, however, that there are no black students in the population of community college students who would meet this definition.

twice the rate for all students. Furthermore, figure C demonstrates that the percentage of actual transfer students *meeting the criteria for inclusion in the denominator* also declined significantly as the definition of potential transfer became more restrictive. In other words, attempts to include only those students most likely to transfer actually exclude a sizable proportion of students who transfer anyway, without meeting those criteria. For example, four out of five actual transfer students did not meet the most restrictive definition considered.

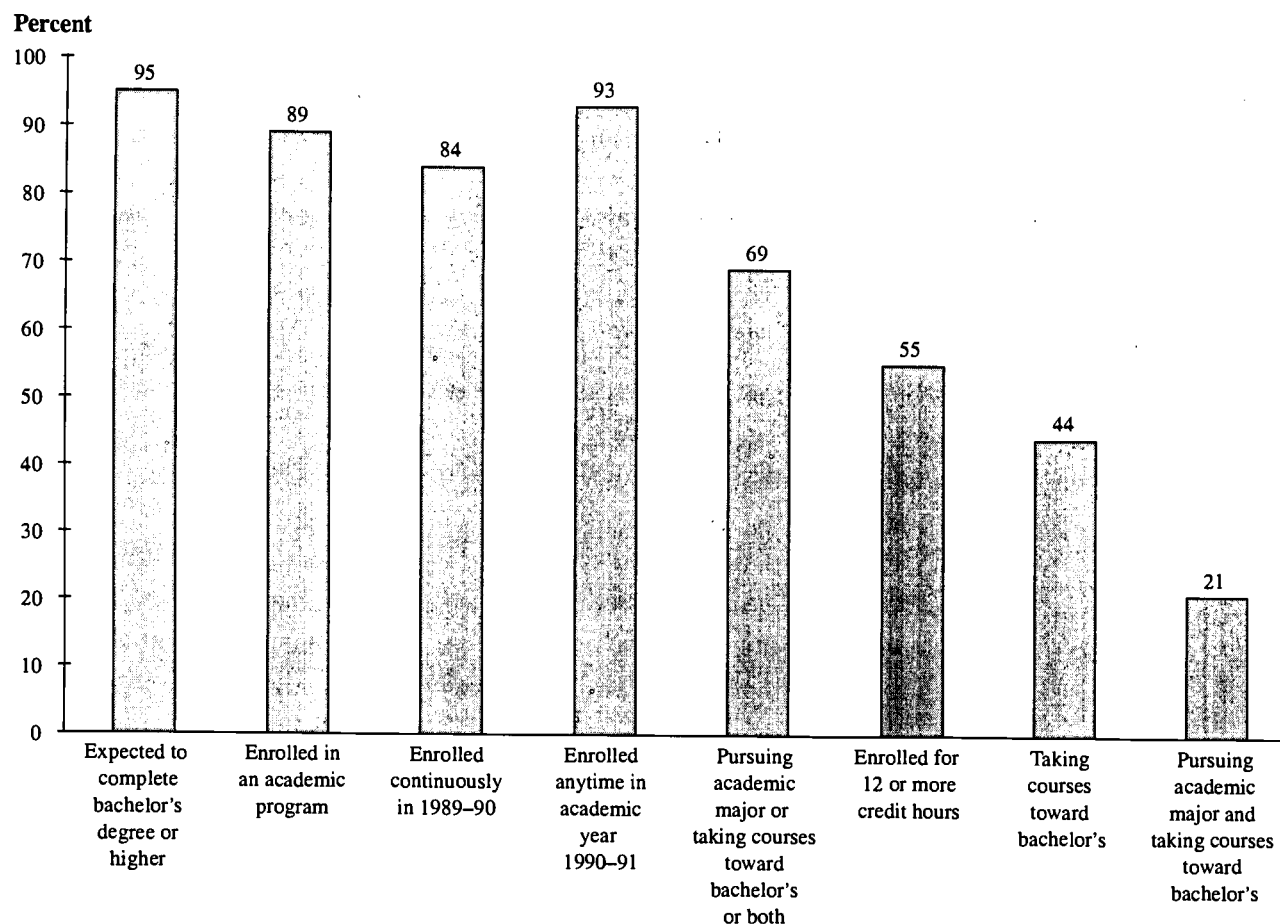
**Figure B.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, for various definitions of potential transfer**



NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Figure C.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions who transferred to 4-year institutions by spring 1994, the percentage who met the various definitions of potential transfer



NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Additional exploratory analyses examined the percentage of 1989–90 community college students who ever transferred to a 4-year institution by spring 1994 for each potential transfer definition, by selected student background characteristics. In several cases, relationships of student characteristics to transfer rates generally persisted even when restricted to students meeting the various potential transfer definitions. For example, in general, the older the age group, the lower the percentage of students who transferred, regardless of the definition of potential transfer that was used. Also, regardless of the potential transfer definition used, higher SES was generally associated with a higher transfer rate.



These results can be placed in the context of the literature about two questions: what percentage of students in community colleges have educational expectations that include a bachelor's degree, and what is the transfer rate for community college students? This contextual information is not intended to constitute a statistical comparison across studies. In general, however, BPS estimates of the percentage of beginning community college students whose expectations included a bachelor's degree or higher, as well as the percentage of students who transferred to a 4-year institution, are higher than estimates based on other datasets. Dougherty (1987, 1992), for example, reviewed several studies and concluded that 30 to 40 percent of all community college entrants aspire to a baccalaureate degree, while the present study found that 71 percent of community college students in BPS expect to complete a bachelor's degree or higher. Similarly, while the *overall* transfer rate found in this study is comparable to the average estimate of 22 percent found by the Transfer Assembly project (Cohen and Sanchez 1997), both the numerator and denominator of the Transfer Assembly project are more restrictive. Although BPS data do not facilitate use of this definition, an approximation of it using BPS data yielded a transfer rate of 33 percent, somewhat higher than that resulting from the Transfer Assembly project.

However, any comparisons between the estimates presented in this report and those from other studies must be considered in light of differences in how the overall population of community college students is defined across studies. For example, BPS excluded students taking courses only for remedial or avocational purposes without receiving credit, while other estimates may include these students. As a result, the typical amount of remediation for students in BPS may underestimate, or otherwise differ from, the amount of remediation found among community college students in general—a factor that might be associated with transfer to a 4-year institution. Furthermore, this report focuses only on students enrolled in public 2-year colleges; including other less-than-4-year colleges, particularly less-than-2-year institutions, may lower the estimates. In addition, BPS data are restricted to first-time beginning postsecondary students; colleges conducting their own studies of transfer may include entering students who are not first-time beginners as defined in the BPS study. Finally, it could also be that student aspirations change appreciably from one cohort to the next, and that estimates therefore could depend in part on when the survey was administered.

## Conclusion

This examination of alternative ways of defining potential transfer was undertaken in part to inform research at the design stage. Which definition (or definitions) is (are) most appropriate for addressing a specific research question? The decision is not straightforward. This report illustrates the trade-off between restricting the pool of potential transfer students and excluding substantial portions of the initial cohort. For example, including students who have an academic major and are taking courses leading toward a bachelor's degree results in a high transfer rate (52 percent), but no more than about 1 in 10 community college

students meets this definition, and it excludes 4 out of 5 transfer students. Restricting the pool to the 70 percent of students who expect to earn a bachelor's degree or higher yields a transfer rate of 36 percent, but fully 95 percent of all transfers have this expectation.

Just as any statistic depends on the specific variables used to indicate the underlying concepts, the transfer rate for community college students is sensitive to the specification of potential transfer. The most complete picture is provided by using multiple indicators, but this approach is not always practical. If data collection costs or other constraints only permit one definition, one strategy is to define the group of potential transfer students broadly enough that it still reflects community college students somewhat generally, while not being so broad as to include students who never harbor plans to transfer to a 4-year college. The results of this study present several alternatives with different advantages and disadvantages.

Overall, the results provide national estimates of community college students' academic expectations and transfer activity. These estimates refine and update our understanding of students' intentions and paths to transfer. Selecting an approach to defining potential transfer is a necessary first step in any effort to analyze the impact of institution type on persistence and attainment. This report has taken a step back and analyzed the definition itself by examining several alternative approaches using a complete nationally representative sample. While the results do not demonstrate the superiority of any single definition, they sharpen one's appreciation for the consequences of measurement decisions and build a firmer foundation for future work on this population.



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# INTRODUCTION

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In fall 1996, 43.5 percent of all first-time, first-year undergraduate students were enrolled in community colleges<sup>2</sup> (Barbett 1998). Some of these students enroll in community colleges expecting to earn a certificate or an associate's degree in a vocational area such as data processing, business support, or automotive technology that will have immediate returns in the labor market. Other students enroll with the intention of taking primarily academic courses and eventually transferring to a 4-year college to earn a bachelor's degree. Still others enter community colleges planning to take no more than one or two classes that are of personal or professional interest. Finally, some students may not have a clearly defined academic or occupational goal when they enter community college, but are simply "experimenting" with postsecondary education (Grubb 1988, 1991). The relative proportions of these various goals, however, have not been definitively established.

Although the course offerings and degree programs of many community colleges can accommodate diverse student interests and goals, preparing students to transfer to a 4-year college remains a central characteristic of community colleges (Brint and Karabel 1989). This preparation is key to community colleges' role in higher education because it affirms community colleges' claim to a collegiate, academic identity and to a role in broadening access for those historically excluded from a college education. Moreover, transfer is a component of most community college students' educational aspirations (Grubb 1991, 195–96).

Despite, or perhaps because of, the importance of transfer from 2- to 4-year institutions, calculating the percentage of community college students who transfer has proven to be somewhat problematic. At first glance, the transfer rate seems relatively unambiguous: it is the number of students who transfer to a 4-year college divided by the number of potential transfer students. However, the numerator and especially the denominator can both be defined in a number of different ways, each having a significant impact on the transfer estimate. Some researchers and practitioners suggest, for example, that the denominator should consist of all students who enter a community college in a given year, regardless of their initial expectations, while others argue that the denominator should only include those students who start out planning, expecting, or hoping to transfer—i.e., the pool of "potential transfer students" (Dougherty 1994; Spicer and Armstrong 1996). If the denominator is restricted to only those community college students with transfer intentions, how should this group be defined?

The purpose of the present study is to use nationally representative community college data to examine several ways of defining potential transfer, the relationship of these definitions to student background char-

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<sup>2</sup>In this report, the terms "community college" and "public 2-year college" refer to a public institution whose highest program of study results in an award or degree below the baccalaureate level and is at least 2 years but less than 4 years in duration.

acteristics, and the relationship of each definition to the resulting transfer rate. This report consists of three sections. The first section describes the dataset used in the analysis and the measurement issues implicated in the study of transfer. The second section presents selected indicators of the key concepts in the study and results of the analysis. The report concludes with a discussion of the results in the context of other studies of community college students and transfer.

## Data Source and Measurement Issues

### *Data Source*

Although a considerable amount of research has investigated community college transfer rates, many of these analyses have used data that are either limited to a cohort of recent high school graduates, such as the National Education Longitudinal Study of 1988 (NELS:88), or are not nationally representative. This study uses the National Center for Education Statistics (NCES) 1990–94 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), a nationally representative sample of all students who enrolled in postsecondary education<sup>3</sup> for the first time between July 1, 1989, and June 30, 1990. To be eligible, a student must have been enrolled during the 1989–90 academic year for one or more of the following purposes: taking course(s) for credit; in a degree or formal award program of at least 3 months' duration; or in an occupationally or vocationally specific program of at least 3 months' duration. Students only taking courses for remedial or avocational purposes without receiving credit were excluded from the sample (Pratt et al. 1996, 5). Follow-up interviews were conducted in spring 1992 and 1994.<sup>4</sup> The BPS:1990/1994 response rate was 91 percent among those students known to be eligible for the study, yielding a total sample of 6,617 students who responded to all three interviews (Berkner, Cuccaro-Alamin, and McCormick 1996; Pratt et al. 1996).

BPS is particularly appropriate for the study of community college students because it is representative of all beginning postsecondary students, not just recent high school graduates. Older, non-traditional beginning postsecondary students and those who may never have completed a high school diploma are more prevalent in community colleges than 4-year institutions (Kojaku and Nuñez 1998). For example, 26 percent

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<sup>3</sup>The 1990 National Postsecondary Student Aid Study (NPSAS:1990), upon which the BPS:1990/1994 sample is based, was designed to include students enrolled in all types of postsecondary education. However, service academies; institutions offering only avocational, recreational, or remedial courses; institutions offering only in-house business courses; those offering only programs of less than 3 months' duration; and those offering only correspondence courses were excluded (McCormick 1997, 69).

<sup>4</sup>A new BPS cohort of 1995–96 beginning students was interviewed in 1996 and re-interviewed in 1998 (BPS:1996/1998). While this new BPS contains additional survey items concerning students' educational goals, only data from the first follow-up interviews were available at the time the current analysis was undertaken (a second follow-up will be administered in 2001). Because the relationship between definitions of potential transfer and the likelihood of transferring are of particular interest in this analysis, the first BPS, for which five academic years of data are available, was considered a more appropriate dataset.

of beginning community college students are age 24 or over, compared with 5 percent of those entering 4-year institutions (Kojaku and Nuñez 1998, 9). In addition, the final follow-up of BPS students occurred 5 academic years after most students had first enrolled, allowing sufficient time for many transfers to occur. BPS also captured all transfers that occurred within this 5-year period, regardless of the control or location of the receiving institution. Thus, students who made lateral or “downward” transfers to other less-than-4-year institutions and then transferred to a 4-year college or university are also included in BPS. (About 20 percent of community college beginners first transferred to a less-than-4-year institution; of those, 9 percent enrolled in a 4-year institution by spring 1994 [McCormick 1997, 32, 41]). In short, BPS is the first study that provides a nationally representative sample of all entering college students at public 2-year institutions, while reflecting all of their transfer activity over an extended period of time.

### ***Measurement Issues***

As noted above, the primary purpose of this study is to examine alternative ways of defining potential transfer, or the sub-population of community college students who may harbor some intention of transferring to a 4-year institution. While BPS is a particularly appropriate dataset with which to study educational expectations and transfer, selecting a set of potential transfer definitions from the wide range of alternatives that have been proposed in previous research is a challenging task. This section reviews issues that researchers have faced in operationalizing the transfer rate, with an emphasis on the denominator, or the pool of potential transfer students.

Calculating a transfer rate requires delineating both the population of potential transfer students and what is considered transfer itself. Although specifying the potential transfer population is particularly problematic and is the primary focus of this report, at least three issues arise when defining what constitutes “transfer.” The level of the destination institution has already been specified because transfer to 4-year institutions is of particular interest in the community college literature (Grubb 1991). Second, assuming that transfer is defined as *subsequent* enrollment,<sup>5</sup> what is the maximum length of time within which a student can enroll in a 4-year college and still be counted as a transfer student for a given cohort of community college students? If this period is very short, the transfer estimate may systematically undercount the transfer of students who initially enroll less than full time or who “stop out” for an extended period (see, e.g., Gutierrez-Marquez 1994; Kojaku and Nuñez 1998). Even students with transfer intentions at the time of entry into postsecondary education may not plan to do so *immediately* following their departure from their first institution (McCormick 1997; Berkner, Horn, and Clune 2000). On the other hand, accounting for all subsequent enrollment would, in essence, require following students until they died, which would be prohibitively expensive and cumbersome.

<sup>5</sup>This definition excludes students who are enrolled at two or more institutions simultaneously: about 5 percent of undergraduates did so in 1995–96 (Horn and Berkold 1998, table 2.1).



Finally, the location and control of the 4-year institution to which a student transfers varies and may be a basis for defining transfer. While the most reliable data available on a routine basis may be transfers to in-state, public institutions (Cohen 1991; Cohen and Sanchez 1997; Palmer and Reish 1991), students who transfer to private or out-of-state institutions are not captured in this definition of transfer. Studies using national longitudinal datasets such as High School and Beyond (HS&B), however, typically count enrollment at any 4-year college or university after leaving a community college as transfer (Lee and Frank 1990; McCormick 1997).

These questions must be answered in specifying the numerator of the transfer rate. However, it is the operationalization of the denominator, or the population of potential transfer students, that varies most widely. Perhaps the most extensively considered issue in defining potential transfer is whether to include all students or only those with transfer intentions. In a recent study, for example, 38 percent of community college entrants said transfer to a 4-year institution was their *primary* reason for enrolling (Berkner, Horn, and Clune 2000). However, students who indicated another primary reason for enrolling, such as to earn a degree or certificate, may nevertheless also intend to transfer to a 4-year institution. If one of the roles of community colleges is to afford all students the opportunity to enter a baccalaureate institution, that preparation might entail raising expectations to a level that would necessitate transfer. The denominator under this assumption would include all students (Gutierrez-Marquez 1994). On the other hand, some identify this as an issue of “fairness,” asserting that community colleges should not be held accountable for the lack of transfer among students who never intended to transfer when they first enrolled in the community college (Gutierrez-Marquez 1994; McCormick 1997). The denominator in this case would be more restrictive.

When restrictions are imposed, one of two broad approaches is usually used: one focusing on what students say they intend to do, the other relying on observable behaviors. Both approaches have limitations. Even when students are asked directly whether or not they intend to transfer, some may say they intend to transfer even when they do not (for example, believing that institutional and financial aid practices reward transfer intentions [Spicer and Armstrong 1996] or perceiving “bachelor’s degree” to be the most socially desirable response). If so, the measure could inadvertently underestimate transfer rates by overestimating the number of students in the denominator. When behavioral indicators, such as completion of a minimum number of credits, are used, they too may be thought to reflect explicit or nascent student intent to transfer, whether as a cause or a result of students’ specific behaviors (Dougherty 1992; Spicer and Armstrong 1996). Yet students may take such actions without harboring intentions to transfer at any time. Thus, some measurement error may occur with either type of criterion.

Self-reported student academic intent can be very difficult to assess, particularly when making specific institutional comparisons, because not all colleges ask students their intentions, those that do use varying question wording that can affect responses, and students’ intentions may change over time (Laanan and Sanchez 1996). Still, both institution-based studies (Gutierrez-Marquez 1994) and national surveys (McCormick 1997) have asked students about their future plans. Some have specifically asked community



college students at time of entry, after a period of enrollment, or both times whether they intend to transfer (Gutierrez-Marquez 1994; Spicer and Armstrong 1996; Berkner, Horn, and Clune 2000), while others have broadly asked about educational expectations or aspirations (McCormick 1997). A previous NCES report, for example, restricted the definition of potential transfer students to those who said that the courses they were currently enrolled in (during their first term in postsecondary education) were leading to a bachelor's degree or higher, inferring intent to transfer on that basis (McCormick 1997).

Cohen (1991) suggests that potential transfer definitions should include only those students who have completed a minimum number of credits, thus having "been enrolled long enough for the college staff to have had a chance to work with them" (p. 3). Thus, his ongoing Transfer Assembly project, designed to produce consistent transfer data for community colleges across the country, aims to exclude students who simply "drop in" to postsecondary education—sampling one or two courses without giving any indications that they are directed toward completion of a specific credential goal. The Transfer Assembly definition, adopted by many researchers because it is widely collected by institutions, includes all students with no previous postsecondary experience<sup>6</sup> who complete a minimum of 12 credits within 4 years (Cohen 1991; Cohen and Sanchez 1997; Gutierrez-Marquez 1994; Laanan and Sanchez 1996; Spicer and Armstrong 1996). Variations on this behavioral definition look at completion of fewer or more credits in more or less time, or consider semesters completed rather than credits earned. Such measures, which necessarily limit the amount of time that may elapse before data are collected, exclude students who take longer than the specified time period to meet the potential transfer criteria. Furthermore, these measures also exclude students who transfer *before* meeting the criteria.

Some studies have limited potential transfer students to those pursuing a specific credential objective at the community college level. Cohen and Sanchez (1997) explain that some of the programs that students might enroll in are more focused toward or compatible with transfer than others. To the extent that students enroll in these programs because they plan to transfer, or develop transfer goals after enrolling in them, credential objectives may reflect transfer intentions. Along these lines, both students' reported current degree objectives (e.g., completion of a certificate or an associate's degree [Gutierrez-Marquez 1994]) and their actual enrollment in certificate or degree programs (Laanan and Sanchez 1996; Spicer and Armstrong 1996) have been employed. Similarly, enrollment in an academic rather than a vocational program of study may be more compatible with subsequent transfer to a 4-year institution (Berkner, Horn, and Clune 2000). Of course, students who are enrolled with no plans for degree completion may also tend to be enrolled in academic rather than vocational courses.

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<sup>6</sup>Many studies have attempted to filter out any effect of previous postsecondary experience by including only those students who are first-time postsecondary or first-time college students (Cohen 1991; Cohen and Sanchez 1997; Gutierrez-Marquez 1994; Laanan and Sanchez 1996; Spicer and Armstrong 1996; McCormick 1997) or students who enrolled in a given term who were not also enrolled at 4-year institutions and did not already have bachelor's degrees (Laanan and Sanchez 1996). Studies that rely on samples of recent high school graduates (Lee and Frank 1990; Grubb 1991) also, in effect, make this restriction.

Finally, recent federal legislation regarding the Student Right-to-Know Act requires schools to report information about the rate of completion and transfer (California Community Colleges Chancellor's Office 1999). Schools must make available information about the transfer rate of degree-seeking students who attempt full-time enrollment in their first term (Spicer and Armstrong 1996). Unlike most of the definitions of transfer used in the literature, however, only students who enroll in a 4-year institution and *do not* first complete a certificate or an associate's degree are counted as transfers.

This section summarized some of the measurement concerns that arise when calculating a transfer rate and some of the approaches that researchers have used to define potential transfer. The following section outlines this report's approach to the measurement of the transfer rate, first defining "transfer" and then delineating the several alternative definitions of "potential transfer" used in the analysis. The results of applying these definitions to the BPS longitudinal dataset are then detailed.

## ANALYSIS AND RESULTS

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The purpose of this analysis is to use data that are nationally representative of the community college population to examine a number of alternative definitions of potential transfer. The approach of this report is similar to that used in analyses of individual community colleges or districts, particularly that of Spicer and Armstrong (1996). Holding the numerator constant, variously restrictive definitions of the denominator are employed based on the different approaches to specifying the potential transfer population found in the literature. The next set of results examines how the composition of the student population captured by each definition of potential transfer changes as the definitions become more restrictive, and the relationship of each definition to the resulting transfer rate.

### Definition of Variables

The operationalization of transfer (the numerator) used in this report is as follows: initial enrollment at a community college followed by subsequent enrollment at any 4-year institution<sup>7</sup> within the 5-year study period. To be counted as a transfer student, the student must have ceased enrollment at the community college; concurrent enrollment at a community college and a 4-year institution is not considered transfer in this study. Activity after enrollment at a 4-year institution is not factored into this definition: if a community college student transferred to a 4-year institution and then re-enrolled at the first institution, the student is still counted as having transferred.<sup>8</sup> Also, following McCormick's (1997) earlier analysis of transfer using BPS:1990/1994, this definition of transfer is based on enrollment only, regardless of whether or not a student transfers credits. About 89 percent of students who attended only two institutions over the course of the study<sup>9</sup> reported transferring credits between the community college where they initially enrolled and the 4-year institution at which they later enrolled (McCormick 1997, 37). Both the percentage of beginning community college students who *ever enrolled* in a 4-year institution (including students who first transferred to another less-than-4-year institution before transferring to a 4-year institution) and the percentage who *first transferred* to a 4-year institution after community college enrollment (including only students whose first transfer was to a 4-year institution) are presented.

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<sup>7</sup>Defined as a public, private not-for-profit, or private for-profit institution that offers 4-year bachelor's degrees. These institutions may or may not also offer master's, doctoral, or first-professional degrees (McCormick 1997, 61).

<sup>8</sup>That is, students who enroll at 4-year institutions with only a short-term purpose, such as to pick up a course not offered at their current institution, are treated here as transfer students. However, since simultaneous enrollment is not counted as transfer, this group may be small. This definition of transfer is consistent with that used in previous NCES reports (McCormick 1997).

<sup>9</sup>These students represent 73 percent of all community college students who transferred to a 4-year institution (McCormick 1997, 37). Credit estimates for students attending more than two institutions are not readily available from BPS:1990/1994.

Potential transfer refers to being eligible for transfer or “at risk” of transfer, and is specified in several ways in this analysis. The broadest definition of potential transfer used in this analysis includes all first-time, beginning community college students, although students only taking courses for which they receive no credit are excluded from the BPS sample. The pool of potential transfer students is then restricted using the eight additional definitions of the denominator described below. These definitions were selected to reflect the widest possible range of measures detailed above, from explicit student goals to behaviors often thought to indicate intent to transfer or commitment to postsecondary education. For more information about the variables used in these definitions, as well as other variables used in the analysis, see the glossary in appendix A.

- 1) *Expected to complete bachelor’s degree or higher.* This is the primary measure of self-reported academic expectations used in this analysis and is based on a student’s response to the question, “What is the highest level of education you ever expect to complete?” The question was asked of students during the base year interview in 1989–90.
- 2) *Enrolled in an academic program.* This definition is based on student reports of whether their program of study during the 1989–90 year was primarily academic or vocational.
- 3) *Enrolled continuously in 1989–90.* Students were considered continuously enrolled if they did not have any period of more than 4 months of nonenrollment during 1989–90. This definition and the one that follows are each intended to roughly approximate the Transfer Assembly approach of looking at only those students who earn 12 credit units (or about 4 classes) over 4 years.<sup>10</sup>
- 4) *Enrolled anytime in academic year 1990–91.* Students indicating enrollment at any postsecondary institution during academic year 1990–91 are included.
- 5) *Enrolled for 12 or more credit hours.* This definition refers to the student’s 1989–90 sampled term (first term of postsecondary enrollment). Although most studies of transfer do not include full-time enrollment as a definition of the pool of potential transfers, this definition approximates the denominator used in the Graduation Rate Survey (GRS) of the NCES Integrated Postsecondary Education Data System (IPEDS). The GRS is designed to help institutions meet the reporting requirements of the Student Right-To-Know legislation.<sup>11</sup>
- 6) *Taking courses toward bachelor’s degree.* This definition is more narrowly focused than the general educational expectations in definition (1) because it refers to the courses the students were specifically enrolled in during the 1989–90 term. Even though students are enrolled at 2-year institutions, those who plan to transfer in the short term might indicate that they are currently working on a

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<sup>10</sup>The Transfer Assembly definition cannot readily be used with BPS data. Although this definition and the next are intended to approximate the Transfer Assembly approach, a student could conceivably take just two courses over a 1- or 2-year period and still meet either of these criteria. Therefore, these definitions are likely to be somewhat less restrictive than the Transfer Assembly model.

<sup>11</sup>However, unlike the current study, the definition of transfer used in GRS includes only those students who have *not* completed a certificate, degree, or transfer-preparatory program.

bachelor's degree. However, in systems where students are encouraged to complete an associate's degree before transfer, students might indicate that they are working on the associate's degree even if they have transfer intentions (McCormick 1997). Such students may, for example, be enrolled in community colleges that have clear articulation agreements with 4-year institutions in the same system.<sup>12</sup>

- 7) *Pursuing academic major or taking courses toward bachelor's degree or both.* This definition of potential transfer excludes those students pursuing a vocational major and taking courses toward an associate's degree, as well as those working on a credential below the associate's degree.
- 8) *Pursuing academic major and taking courses toward bachelor's degree.* While definition (7) includes students meeting either of these criteria, this highly restrictive definition requires students to meet both. Although it also excludes those students with a vocational focus, this specification serves as an attempt to exclude those students who may only be experimenting with postsecondary education.

The analysis begins with estimating the percentage of the 1989–90 cohort of community college students who meet each of these definitions of potential transfer. The relationship of these criteria to various other student characteristics is then explored. First, the degree to which the composition of the pool of potential transfer students varies as the definition becomes more restrictive is examined. Then, consideration is given to whether different subgroups of students are more or less likely to meet each definition. Finally, a transfer rate is calculated for each group of potential transfer students. The following section describes the results of this analysis.

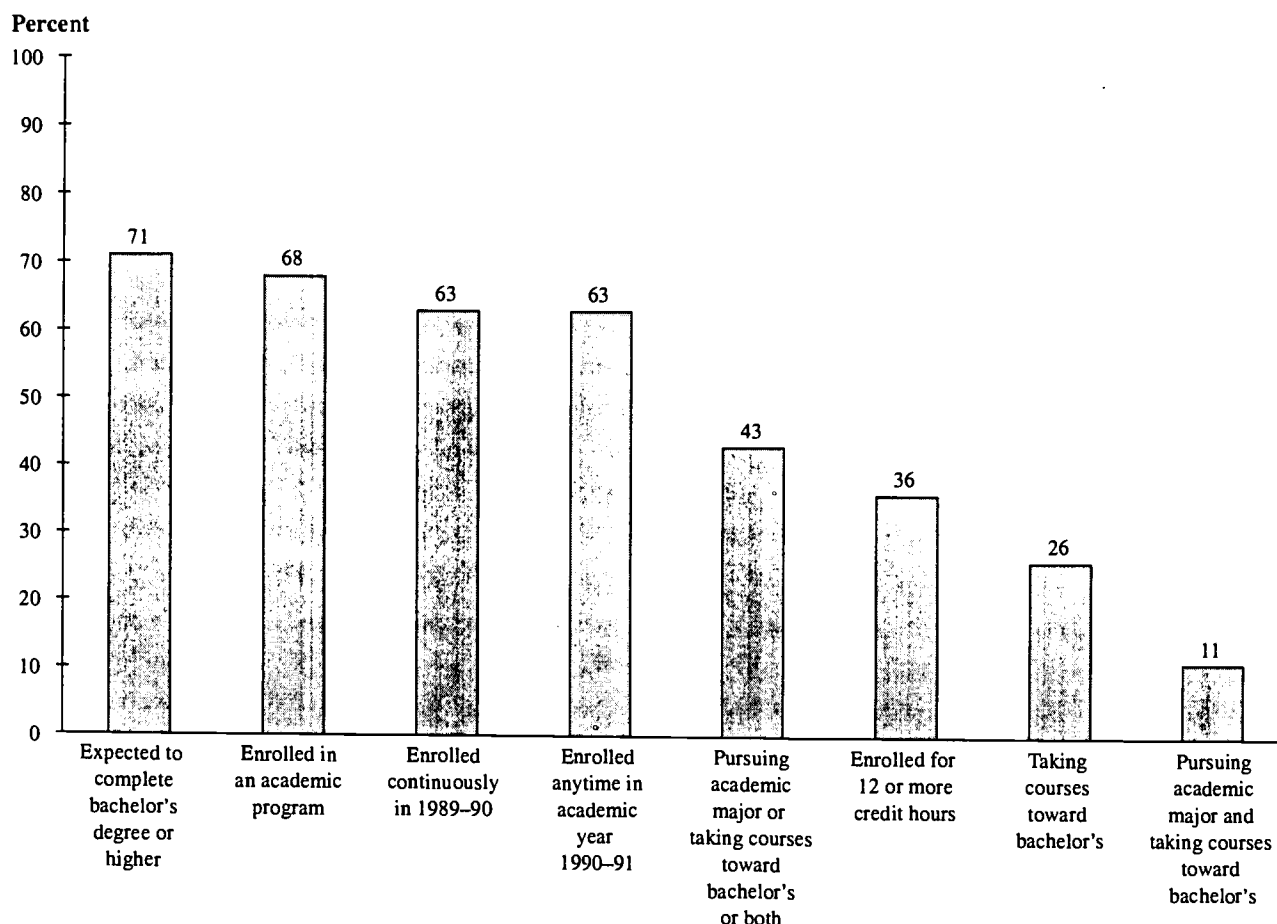
## Results

Figure 1 presents the percentage of the 1989–90 community college cohort meeting each definition of potential transfer described above. Overall, 71 percent of beginning community college students responded that they anticipated earning a bachelor's degree or higher when asked, "What is the highest level of education you ever expect to complete?" Also, the majority of students were enrolled in an academic program, enrolled continuously in 1989–90, and enrolled during the 1990–91 academic year. Less than half of the students met the other definitions, with 11 percent of the students both having an academic major and taking courses leading toward a bachelor's degree.

Throughout the remainder of the report, the definitions of potential transfer are ordered according to the percentage of the initial cohort meeting each definition. They are referred to as "increasingly restrictive"

<sup>12</sup>An unknown proportion of students, moreover, may misunderstand the question. As shown below, however, students in this category do have a higher than average rate of transfer to 4-year institutions.

Figure 1.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, the percentage of the initial cohort meeting each definition of potential transfer



NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

because the total proportion of the cohort that is included generally decreases, although the more restrictive groups are not necessarily subsets of the less restrictive groups. Generally, about 70 percent or more of students meeting the criteria for a given definition of potential transfer also met the less restrictive definitions. For example, 82 percent of students enrolled in an academic program also expected to earn a bachelor's degree or higher (see table C7 in appendix C). Among those enrolled for 12 or more credit hours, however, about half (52 percent) indicated that they were pursuing an academic major or taking courses toward a bachelor's degree or both, while 45 percent of students indicating that they were taking courses toward a bachelor's degree were also enrolled for 12 or more credit hours.



***Does the composition of the group of potential transfer students change as the definition becomes more restrictive?***

Restricting the group of potential transfer students according to these definitions may alter the composition of the group, since these educational characteristics are themselves associated with other background variables (Berkner, Cuccaro-Alamin, and McCormick 1996). Table 1 shows the percentage distributions of all beginning community college students and students meeting each definition of potential transfer according to several student characteristics. Definitions of potential transfer are ordered by the proportion of the initial student cohort included in that definition (see figure 1). Caution should be exercised in interpreting this table, as many of the percentages shown are based on small sample sizes, which produce rather inefficient estimates. Still, some relationships are observed in this table.

In particular, the increasing restriction of the definition of potential transfer was associated with several of the characteristics considered. As the definition of potential transfer became more restrictive, the percentage of the pool that was in the highest socioeconomic status (SES) quartile increased from 30 percent of all beginning postsecondary students to 51 percent of beginning postsecondary students with an academic major taking courses leading toward a bachelor's degree. The proportion of students meeting each definition who were in the lowest SES quartile decreased from 19 to 8 percent of potential transfer students. Furthermore, in this sample, none of the students meeting the most restrictive definition of potential transfer were black, compared to 6 to 10 percent black students in each of the other potential transfer groups.<sup>13</sup>

Across increasingly restrictive definitions of potential transfer, the proportion of the pool that was age 18 or younger increased and the proportion that was age 22 or older decreased. Other relationships are consistent with this pattern: the proportion of students who were dependent (who are likely to be younger students; [Berkner, Cuccaro-Alamin, and McCormick 1996]) also increased, from 65 percent of all students to 88 percent of those in the most restrictive pool of potential transfer students. In general, the restricted groups of potential transfer students had higher proportions of dependent students than the sample overall. On the other hand, the proportion delaying postsecondary enrollment more than a year after high school (who are likely to be older students; [Berkner, Cuccaro-Alamin, and McCormick 1996]) decreased with increasing restriction of the sample. The restricted pools of potential transfers generally had lower proportions of students who delayed enrollment compared to the entire cohort.<sup>14</sup> The percentage of students working full time (35 or more

<sup>13</sup>This does not necessarily mean, however, that there are no black students in the population of community college students who would meet this definition. One possible explanation for this finding is that black students may be more likely than white or Hispanic students to indicate that they are pursuing an academic major and taking courses leading toward an associate's degree (rather than a bachelor's), in which case they would not be included in this most restrictive definition. Students pursuing a vocational major and taking courses leading toward a bachelor's degree are also excluded from this definition.

<sup>14</sup>Although the difference in this percentage between the total cohort and the most restrictive definition appears large, the latter group is small and has a large standard error, so the difference is not statistically significant.

Table 1.—Percentage distributions within potential transfer categories of 1989–90 beginning postsecondary students enrolled at public 2-year institutions according to various student and institution characteristics

Characteristic	Total	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both		Pursuing academic major and taking courses toward bachelor's	
						Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Enrolled for 12 or more credit hours	Taking courses toward bachelor's
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Age as of 12/31/89									
18 or below	43.9	50.9	53.6	52.8	53.3	58.9	61.9	58.6	55.5
19 through 21	28.9	30.2	28.9	25.9	26.2	28.5	26.0	29.7	36.2
22 and above	27.1	18.9	17.6	21.2	20.5	12.6	12.1	11.7	8.3
22 through 24	5.9	5.4	4.1	4.9	5.4	3.0	2.5	3.0	2.2
25 through 34	12.1	8.0	8.2	9.9	9.6	6.4	6.4	6.2	6.1
35 through 44	6.2	4.7	4.0	5.1	4.1	2.7	2.8	2.5	0.0
45 or above	2.9	0.8	1.2	1.4	1.4	0.5	0.4	0.0	0.0
Socioeconomic status									
Lowest quartile	18.6	13.5	11.2	14.0	15.1	11.3	13.8	11.7	8.2
Lower middle	20.8	18.6	18.5	17.1	16.9	13.8	10.5	13.9	10.1
Upper middle	30.3	31.4	31.5	32.3	32.0	31.5	35.1	26.0	30.3
Highest quartile	30.3	36.6	38.8	36.7	36.0	43.5	40.6	48.4	51.4
First generation college status									
First generation	50.5	43.0	43.3	43.5	46.6	41.8	43.8	37.3	30.3
Not first generation	49.5	57.0	56.7	56.5	53.4	58.2	56.2	62.7	69.7
Gender									
Male	49.0	49.8	50.1	44.8	48.0	54.3	51.0	58.8	56.8
Female	51.0	50.3	49.9	55.2	52.0	45.7	49.0	41.2	43.2
Race/ethnicity									
White, non-Hispanic	75.9	73.7	76.5	77.3	75.0	71.6	75.2	69.9	68.3
Black, non-Hispanic	8.5	9.7	7.3	6.5	6.5	8.9	7.4	6.4	0.0
Hispanic	11.1	11.7	11.1	11.3	13.0	12.3	11.8	14.6	21.8
Asian/Pacific Islander	3.7	4.0	4.2	4.1	4.8	5.9	5.1	7.9	8.1
American Indian/Alaskan Native	0.7	0.9	0.8	0.8	0.8	1.3	0.4	1.2	1.8



Table 1.—Percentage distributions within potential transfer categories of 1989–90 beginning postsecondary students enrolled at public 2-year institutions according to various student and institution characteristics—Continued

Characteristic	Total	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or			Pursuing academic major and taking courses toward bachelor's
						taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	
Region of institution									
Northeast	21.2	21.4	20.7	18.2	20.3	19.8	24.5	15.0	12.3
New England	4.8	3.7	4.3	3.3	3.6	2.4	5.1	2.4	1.6
Mid East	16.4	17.7	16.4	14.9	16.7	17.4	19.4	12.6	10.7
Midwest	21.3	20.0	19.8	21.8	21.0	20.5	20.5	22.1	14.3
Great Lakes	14.7	13.4	14.5	15.6	14.4	14.2	15.3	15.2	11.1
Plains	6.7	6.6	5.3	6.2	6.5	6.3	5.2	6.8	3.2
South	29.6	29.6	28.6	30.4	30.2	25.0	29.6	25.6	22.6
Southeast	21.4	21.1	21.8	22.6	20.8	19.5	20.0	19.0	16.1
Southwest	8.2	8.5	6.9	7.8	9.4	5.5	9.6	6.6	6.6
West	27.9	29.0	30.9	29.6	28.5	34.7	25.4	37.3	50.8
Rocky Mountains	3.0	2.3	2.9	3.3	3.1	3.4	2.5	2.6	3.2
Far West	24.9	26.7	28.0	26.3	25.5	31.3	22.9	34.8	47.7
Self-rated academic ability									
Above average	24.4	28.3	28.7	28.5	30.2	29.2	30.2	28.7	31.9
Average	72.9	69.5	68.8	68.9	67.2	68.4	68.0	69.7	66.3
Below average	2.7	2.2	2.6	2.6	2.6	2.3	1.8	1.6	1.8
Self-rated mathematical ability									
Above average	22.7	25.9	25.7	25.9	24.6	28.6	28.3	32.0	26.8
Average	60.0	54.3	54.6	56.0	58.5	49.9	55.8	47.1	50.3
Below average	17.3	19.9	19.7	18.1	16.9	21.5	15.9	20.9	23.0
Took remedial math 1989–90									
No	88.5	86.9	87.5	88.2	87.5	82.9	89.2	84.4	93.6
Yes	11.4	13.1	12.5	11.8	12.4	17.1	10.9	15.6	6.4
Delayed enrollment after high school									
No	56.0	64.5	66.4	66.5	66.0	72.7	74.2	71.7	70.0
Yes	44.0	35.5	33.6	33.5	34.0	27.3	25.8	28.3	30.0

Table 1.—Percentage distributions within potential transfer categories of 1989–90 beginning postsecondary students enrolled at public 2-year institutions according to various student and institution characteristics—Continued

Characteristic	Total	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both			Pursuing academic major and taking courses toward bachelor's	
						Enrolled in academic year 1990–91	taking courses toward bachelor's or both	or more credit hours	Taking courses toward bachelor's	academic major and taking courses toward bachelor's
Attendance intensity										
Full time	48.5	54.9	54.3	61.6	56.1	56.4	98.3	57.4	58.9	
Less than full time	51.5	45.1	45.7	38.4	43.9	43.6	1.7	42.6	41.1	
Campus participation index										
2 or below	37.0	30.2	30.7	30.5	29.7	24.0	23.3	26.9	22.4	
3-4	33.8	35.5	36.6	35.6	38.0	38.7	39.8	39.3	49.3	
5-6	19.3	23.3	22.2	21.1	21.9	28.0	22.4	24.3	19.2	
7 or above	9.8	11.0	10.4	12.8	10.5	9.3	14.5	9.5	9.1	
Single parent										
No	93.3	95.8	94.6	95.5	95.2	97.5	95.5	95.3	96.6	
Yes	6.7	4.2	5.4	4.5	4.8	2.5	4.5	4.7	3.4	
Dependency status										
Dependent	65.4	74.6	76.1	71.8	73.8	81.1	83.3	84.6	87.5	
Independent	34.6	25.4	23.9	28.1	26.2	18.9	16.7	15.4	12.5	
Hours worked per week										
Fewer than 35	67.7	72.2	75.4	75.2	73.8	79.1	86.9	79.0	79.5	
35 or more	32.3	27.8	24.6	24.8	26.1	20.9	13.1	21.0	20.5	
Received financial aid										
No	72.2	73.0	75.2	68.4	70.6	74.6	60.7	77.7	81.0	
Yes	27.8	26.9	24.8	31.6	29.4	25.4	39.3	22.4	19.0	

**Table 1.—Percentage distributions within potential transfer categories of 1989–90 beginning postsecondary students enrolled at public 2-year institutions according to various student and institution characteristics—Continued**

Characteristic	Total	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both			Pursuing academic major and taking courses toward bachelor's		
						Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's			
Ratio of aid to price*											
No aid	71.9	73.0	75.1	68.2	70.6	75.0	77.9	81.8			
1–33 percent	15.3	13.7	13.8	17.0	16.4	12.4	11.6	11.4			
34–67 percent	6.3	6.9	5.9	7.6	6.5	7.2	8.3	3.9			
68–100 percent	6.5	6.4	5.2	7.2	6.6	5.4	2.3	3.0			

\* Price adjusted for attendance intensity. See the glossary (appendix A) for details.

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment). Percentage distributions may not sum to 100.0 due to rounding.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

hours a week) was also higher the more inclusive the definition of potential transfer. Also, the percentage of potential transfers in the West, particularly the Far West, was higher the more restrictive the definition.

Students were asked to compare their ability in several areas to the average person of their age. The percentage of potential transfer students who rate themselves as having “above average” academic ability increased as the definitions became more restrictive, comprising 24 percent of all students but 32 percent of students working toward a bachelor’s degree in an academic major. This pattern was also found for self-ratings of mathematical ability compared to others. Students meeting increasingly restrictive definitions of potential transfer were also less likely to score low (2 or less out of 9) on an index of participation in student life (including participation in school-sponsored extracurricular activities, interaction with other students and faculty, and the like).

In sum, this table suggests that restricting the pool of potential transfer students not only changes the composition of the student pool, but alters it systematically toward greater proportions of higher SES students and more traditional students (younger, dependent students who do not work full time).

***What percentage of students with different characteristics meet each potential transfer definition?***

The previous section examined how the composition of the population of potential transfer students changed as the definitions became more restrictive. This section takes another approach to exploring the relationship between potential transfer and other student characteristics, comparing the likelihood of meeting each definition of transfer across various subgroups of students (table 2). In general, students age 22 or older were less likely than younger students to meet the various definitions of potential transfer. For example, about 50 percent of students age 22 or older expected to earn a bachelor’s degree or higher, compared to 75 percent of students ages 19 to 21 and 81 percent of students age 18 or younger. Likewise, 11 percent of students age 22 or older indicated that they were taking courses leading toward a bachelor’s degree in 1989–90, compared to 26 percent of students ages 19 through 21 and 33 percent of students age 18 or below.

Generally, the higher the SES, the higher the percentage of students who met the definitions of potential transfer. For instance, 16 percent of students from the lowest SES quartile indicated that they were taking courses leading toward a bachelor’s degree, compared to 40 percent of students from the highest SES quartile. First-generation students, defined as those who reported that their parents had no more than a high school education, were less likely to meet each definition of potential transfer than those who were not first-generation students. For example, 62 percent of first-generation students expected to complete a bachelor’s degree or higher, compared to 81 percent of those who were not first-generation students.

While the bachelor’s degree expectations of men and women were about the same, men were less likely to have been enrolled continuously during 1989–90, but more likely to indicate that they were working

Table 2.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by various student and institution characteristics

Characteristic	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's
Total	71.0	67.7	63.2	62.5	43.2	36.1	25.5	10.6
Age as of 12/31/89								
18 or below	80.7	76.8	72.9	75.8	55.1	50.7	33.4	12.8
19 through 21	74.9	71.5	61.1	56.6	43.9	31.9	26.1	13.7
22 or above	50.5	46.8	48.9	47.2	21.1	16.5	11.3	3.4
22 through 24	63.1	54.1	48.6	56.9	23.9	15.9	13.0	4.4
25 through 34	48.2	47.0	52.5	49.7	22.7	19.2	13.1	5.3
35 through 44	51.7	45.6	50.9	41.3	20.5	16.3	10.8	0.0
45 or above	—	—	—	—	—	—	—	—
Socioeconomic status								
Lowest quartile	53.2	45.3	51.1	50.8	28.1	27.9	16.2	5.0
Lower middle	64.2	61.1	51.8	50.8	29.2	18.2	17.3	5.3
Upper middle	73.6	68.6	66.1	66.1	44.3	41.3	22.1	10.5
Highest quartile	83.3	83.1	74.6	74.1	59.4	48.0	39.7	17.2
First-generation college status								
First generation	62.0	60.7	56.5	59.2	37.7	33.0	19.6	6.7
Not first generation	81.0	77.7	71.2	69.0	51.3	42.5	32.6	15.1
Gender								
Male	71.9	68.6	57.9	61.2	46.7	37.8	30.8	12.0
Female	70.1	66.9	68.3	63.7	39.6	34.5	20.5	9.2
Race/ethnicity								
White, non-Hispanic	69.0	68.2	63.9	61.7	40.5	36.0	23.5	9.5
Black, non-Hispanic	81.5	62.0	48.2	47.8	45.4	31.1	19.3	0.0
Hispanic	75.0	64.7	65.6	72.9	48.7	37.0	32.7	21.1
Asian/Pacific Islander	—	—	—	—	—	—	—	—
American Indian/ Alaskan Native	—	—	—	—	—	—	—	—

Table 2.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by various student and institution characteristics—Continued

Characteristic	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's
Region of institution								
Northeast	68.6	64.5	54.3	60.1	38.0	40.9	18.3	5.8
New England	53.8	—	—	47.7	—	37.2	—	—
Mid East	72.8	64.9	57.2	63.7	43.0	42.0	19.6	6.5
Midwest	67.4	63.6	64.9	61.5	41.4	34.2	26.5	7.1
Great Lakes	66.8	65.7	64.6	61.6	41.6	36.9	26.1	8.0
Plains	68.7	58.5	65.6	61.4	41.0	28.3	27.6	5.0
South	70.8	68.0	65.4	63.6	38.4	37.3	22.2	8.6
Southeast	69.5	71.5	66.0	60.7	41.9	35.9	22.5	8.5
Southwest	74.4	58.8	63.6	71.3	29.5	40.8	21.5	8.7
West	76.4	73.5	66.5	63.9	53.9	32.6	33.6	19.4
Rocky Mountains	—	—	—	—	—	—	—	—
Far West	78.1	74.5	65.7	63.9	54.6	32.8	35.1	20.4
Self-rated academic ability								
Above average	78.7	74.5	71.8	77.5	50.8	44.1	29.2	13.7
Average	69.2	65.2	60.0	57.8	40.5	34.1	24.1	9.7
Below average	—	—	—	—	—	—	—	—
Self-rated mathematical ability								
Above average	77.6	72.7	70.7	67.8	52.8	44.3	34.9	12.3
Average	66.1	62.6	59.6	61.1	35.9	34.1	20.0	8.9
Below average	80.3	77.4	65.4	61.1	54.5	33.0	30.4	14.4
Took remedial math in 1989–90								
No	70.1	66.8	63.4	61.3	40.5	36.7	24.0	11.0
Yes	79.7	72.6	64.9	67.3	60.0	33.8	33.6	5.4
Delayed enrollment after high school								
No	80.4	76.9	72.7	73.6	53.4	47.5	32.2	12.7
Yes	58.6	54.9	50.1	48.3	28.6	21.4	16.7	7.7

**Table 2.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by various student and institution characteristics—Continued**

Characteristic	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both			Pursuing academic major and taking courses toward bachelor's	
					Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's		
Attendance intensity									
Full time	78.6	72.8	78.8	72.3	74.3	28.7	12.3		
Less than full time	63.7	62.6	48.3	53.3	1.2	21.0	8.7		
Campus participation index									
2 or below	59.4	61.0	52.5	51.9	23.3	19.0	7.0		
3–4	75.4	69.8	66.3	72.6	42.4	28.9	14.2		
5–6	82.1	75.8	68.8	73.3	42.4	31.8	10.0		
7 or above	79.0	71.3	80.7	68.9	54.2	24.4	9.4		
Single parent									
No	73.0	68.5	64.5	63.6	37.2	26.0	11.0		
Yes	42.6	58.4	43.9	44.9	24.4	17.7	6.0		
Dependency status									
Dependent	80.5	76.0	68.7	70.5	45.6	32.6	13.7		
Independent	52.8	50.3	52.4	47.3	17.7	11.6	4.1		
Hours worked per week									
Fewer than 35	75.7	72.4	70.0	68.2	46.1	29.4	12.1		
35 or more	61.3	56.5	48.8	50.5	14.9	17.0	7.1		
Received financial aid									
No	72.0	70.7	60.0	61.1	30.3	27.3	12.1		
Yes	68.6	60.2	71.5	66.1	51.1	20.6	7.0		

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Table 2.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by various student and institution characteristics—Continued

Characteristic	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's
Ratio of aid to price*								
No aid	72.7	71.0	59.9	61.6	45.7	30.8	27.7	12.0
1–33 percent	62.7	58.6	68.1	67.4	33.5	49.1	19.3	7.4
34–67 percent	79.0	68.7	76.9	64.5	52.0	50.2	35.5	6.8
68–100 percent	72.1	56.9	74.3	63.5	34.0	57.0	9.1	4.5

— Too few cases for a reliable estimate.

\*Price adjusted for attendance intensity. See the glossary (appendix A) for details.

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.



toward a bachelor's degree. Men and women were equally likely to meet the most restrictive definition of potential transfer.

Hispanic students were about as likely as other students to indicate that they expected to earn a bachelor's degree or higher, but were more likely than black students to have enrolled anytime during academic year 1990–91 (figure 2). White students and Hispanic students were more likely than black students to meet the most restrictive definition of transfer: having an academic major and taking courses toward a bachelor's degree. Students attending community colleges in the West were more likely than students attending schools in other regions of the country to have academic majors and be taking courses leading toward a bachelor's degree (the most restrictive definition of potential transfers), but were no more likely to indicate that they expected to earn a bachelor's degree or higher (the least restrictive definition).

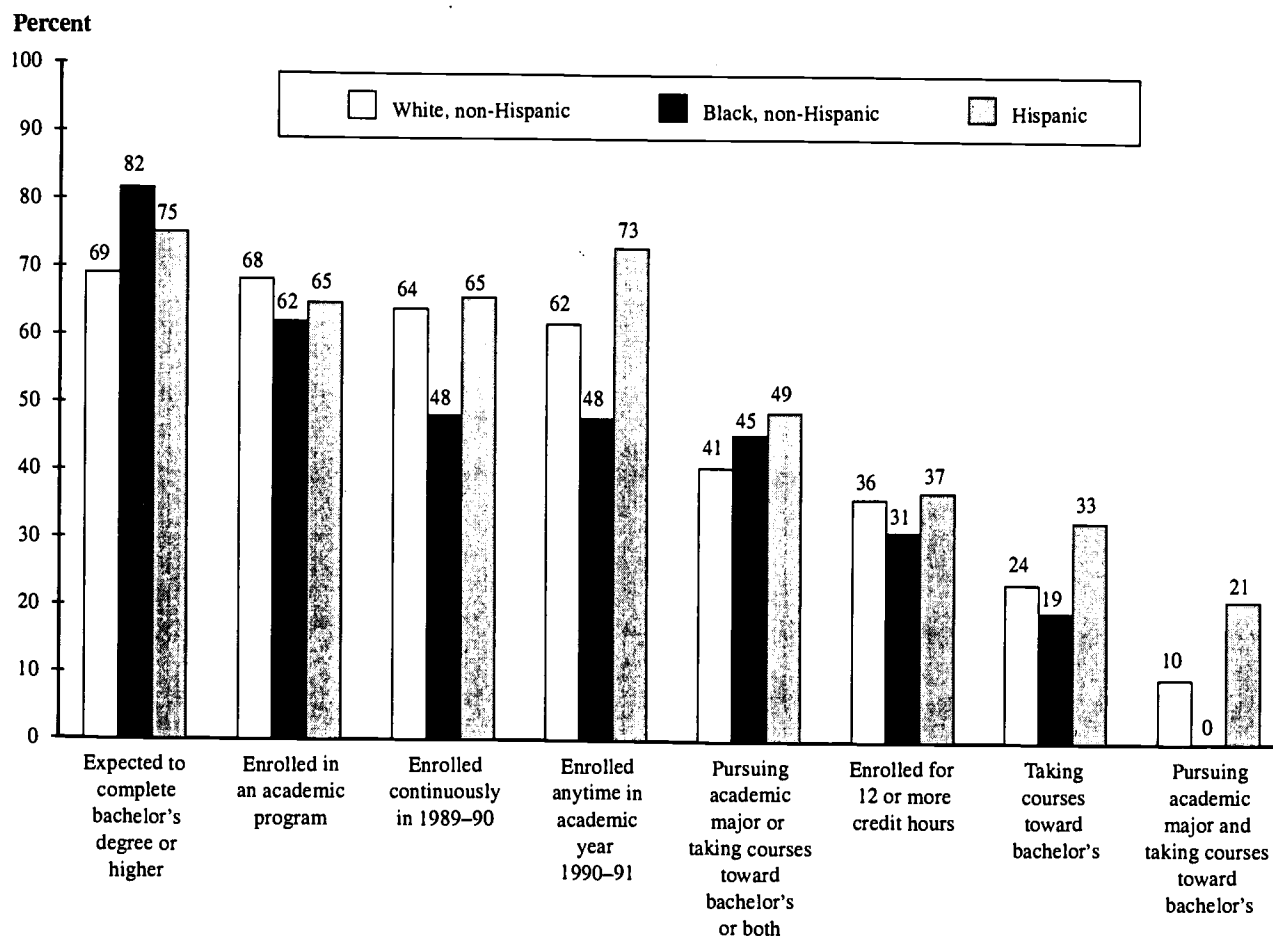
While students who rated themselves above average in mathematical ability and those who rated themselves below average were both more likely to indicate that they expected to earn a bachelor's degree or higher than students who rated themselves average, there were few differences across self-reported ability levels in the other definitions of potential transfer. Students who reported taking at least 1 credit hour of remedial mathematics instruction during 1989–90 were generally about as likely to meet each of the potential transfer definitions as students who did not take any remedial mathematics instruction. In general, students who were enrolled full time were more likely to meet the various potential transfer definitions than those who were enrolled less than full time.

In general, students who reported working 35 or more hours per week were less likely than students working fewer hours to meet the definitions of potential transfer. For example, 49 percent of students working 35 or more hours per week were enrolled continuously in 1989–90, compared to 70 percent of those who worked fewer than 35 hours per week. Students who did not receive financial aid were about as likely as students who did receive financial aid to expect to earn a bachelor's degree or higher and to be enrolled anytime during academic year 1990–91. Students who did not receive financial aid, however, were less likely to be enrolled continuously in 1989–90 and less likely to be enrolled for 12 or more credit hours in the 1989–90 sampled term than were students who received financial aid.

### *Transfer rates for each definition of potential transfer*

Estimated transfer rates for the nine definitions of potential transfer among 1989–90 beginning community college students are shown in table 3. Table 3 also shows the transfer rate of community college students that did not meet a given definition of potential transfer. Rates of transfer to 4-year institutions are shown both for *first* transfer—the first enrollment following termination of enrollment at a community college—and for whether the students had *ever* enrolled at a 4-year institution by 1994. The results show that, in general, the transfer rate increased across increasingly restrictive definitions. The lowest rate of *ever* enroll-

Figure 2.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by race/ethnicity



NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

ing in a 4-year institution, 25 percent, was found for all beginning community college students, compared to 52 percent among students meeting the most restrictive definition. The proportions of students *first* transferring to 4-year institutions were similar for each definition, ranging from 22 to 51 percent.<sup>15</sup> For each definition, the transfer rate for students meeting the definition was higher than the transfer rate for students not meeting the definition.

<sup>15</sup>The estimates of the proportions *ever* attending 4-year institutions appear higher by a few percentage points for each category, due to the fact that the numerator is more inclusive while the denominator stays the same. The differences in rates between the two estimates are not statistically significant. Results below focus on the rate of ever enrolling in a 4-year institution.

**Table 3.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, for various definitions of potential transfer**

Potential transfer definition	First transferred to 4-year <sup>1</sup>	Ever transferred to 4-year <sup>2</sup>
All students	22.4	25.4
Expected to complete bachelor's degree or higher	31.8	35.7
<i>Students not meeting this definition</i>	3.4	4.7
Enrolled in an academic program	32.9	35.7
<i>Students not meeting this definition</i>	8.6	9.6
Enrolled continuously in 1989–90	33.3	36.6
<i>Students not meeting this definition</i>	9.6	11.6
Enrolled anytime in academic year 1990–91	33.2	37.7
<i>Students not meeting this definition</i>	4.2	4.9
Pursuing academic major or taking courses toward bachelor's or both	39.9	43.0
<i>Students not meeting this definition</i>	13.3	15.0
Enrolled for 12 or more credit hours	36.6	39.6
<i>Students not meeting this definition</i>	15.2	18.2
Taking courses toward bachelor's	38.7	44.8
<i>Students not meeting this definition</i>	17.9	19.9
Pursuing academic major and taking courses toward bachelor's	50.7	52.3
<i>Students not meeting this definition</i>	21.8	24.1

<sup>1</sup>Includes only students whose first transfer from a community college was to a 4-year institution.

<sup>2</sup>Includes students who first transferred to another less-than-4-year institution before transferring to a 4-year institution.

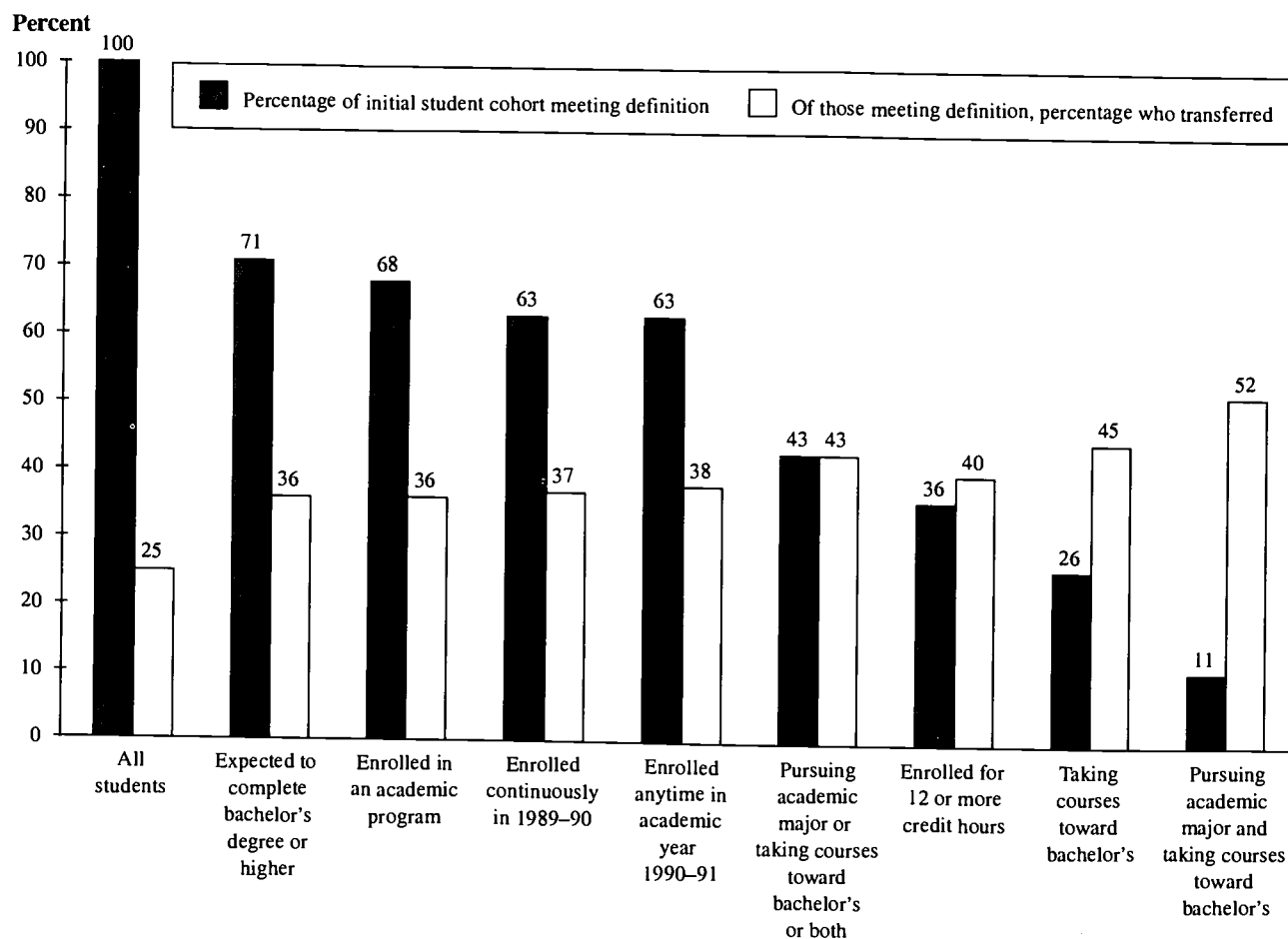
NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Figure 3 displays two sets of estimates. For each potential transfer definition, the figure shows the percentage of the initial cohort meeting that definition and the rate of transfer to 4-year institutions among students meeting that definition. For example, 63 percent of the initial cohort enrolled continuously during their first year of postsecondary education in 1989–90, and of these students, 37 percent transferred. Figure 4 presents another statistic relevant to the evaluation of these definitions: the percentage of actual transfer students meeting each definition. For example, among 1989–90 community college students who had transferred to a 4-year institution by spring 1994, 44 percent indicated that the courses they were taking were leading toward a bachelor's degree.

When considered together, two facts are evident in figures 3 and 4. First, as suggested earlier, the transfer rate generally increased with the increasing restriction of the group of potential transfer students (figure 3). In fact, the transfer rate for the most restrictive definition was at least twice the rate for all students: while roughly one-quarter of all students transferred, about one-half of those pursuing an academic major and

Figure 3.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, and of those students meeting the definition, the percentage who transferred to 4-year institutions by spring 1994

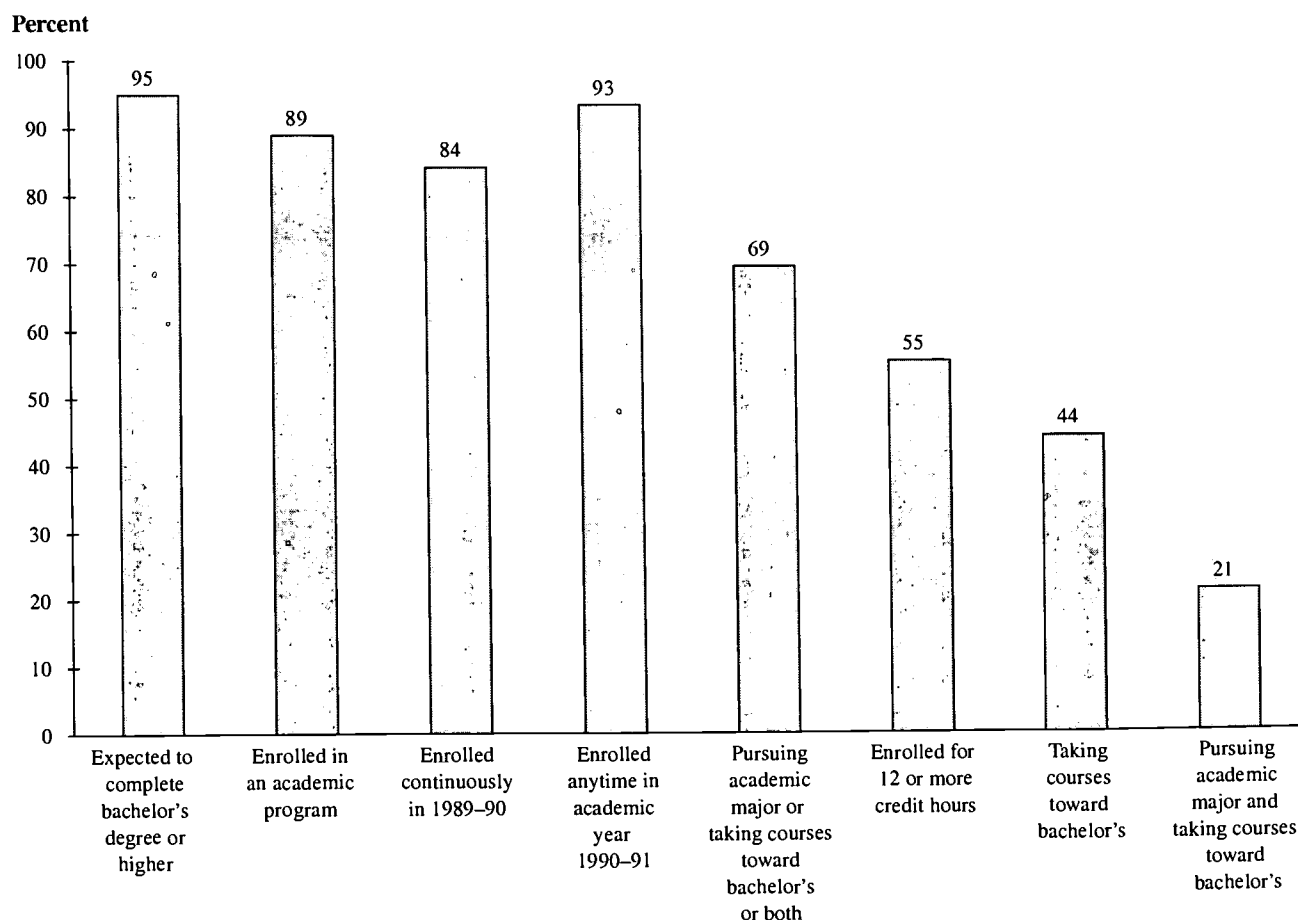


NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

working toward a bachelor's degree did so. Second, the percentage of *actual transfer students meeting the criteria for inclusion in the denominator* also declined significantly with the increasing restriction of the definition of potential transfer (figure 4). In other words, attempts to include only those students most likely to transfer actually exclude a sizable proportion of students who transfer anyway, without meeting those criteria. For example, four out of five actual transfer students did not meet the most restrictive definition considered. Accordingly, as shown in table 3, while the transfer rate of students not meeting the least restrictive definition—expecting to complete a bachelor's degree or higher—was relatively small (5 percent), the transfer rate of students not meeting the more restrictive definitions was relatively high (e.g., 20 percent among those not taking courses leading toward the bachelor's degree).

**Figure 4.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions who transferred to 4-year institutions by spring 1994, the percentage who met the various definitions of potential transfer**



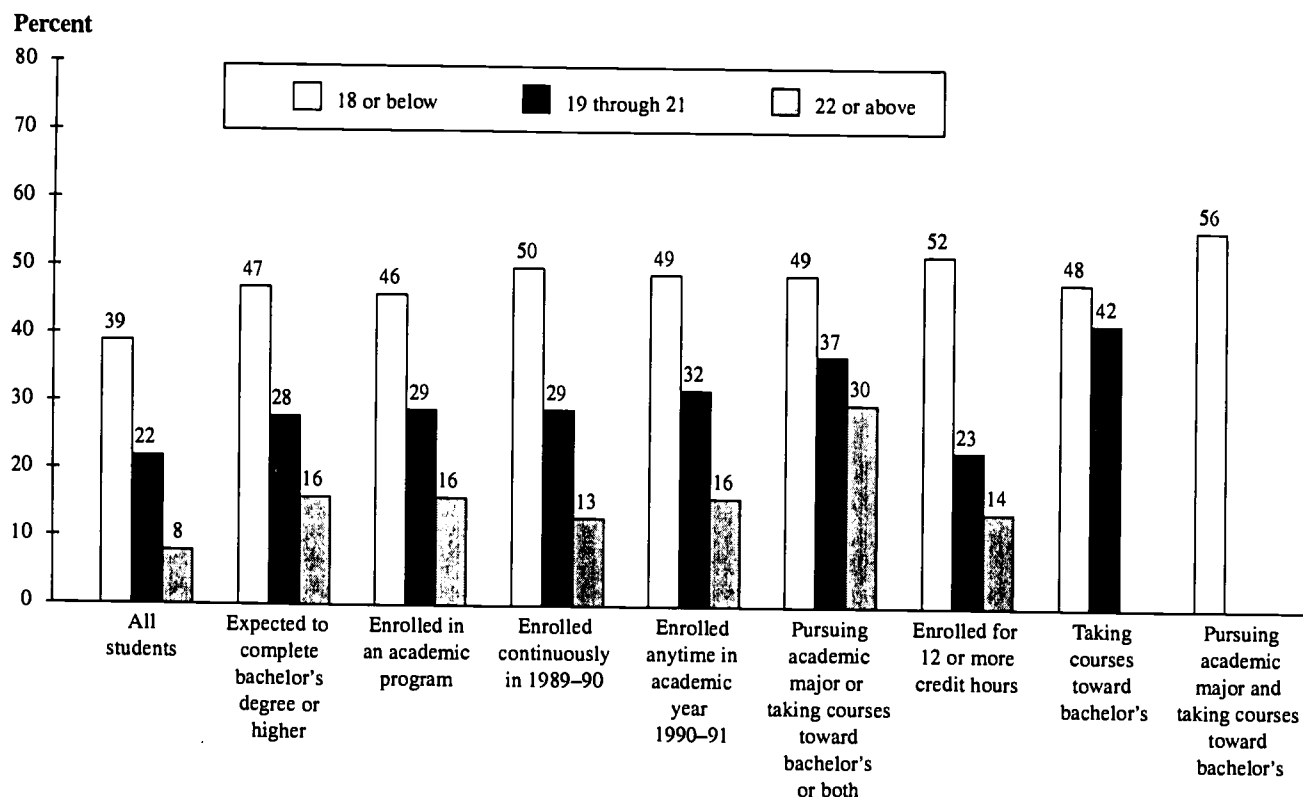
NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Figures 5 through 8 present the percentage of 1989–90 community college students who ever transferred to a 4-year institution by spring 1994 for each potential transfer definition, by selected student background characteristics.<sup>16</sup> For example, figure 5 shows that 39 percent of all students 18 years old or younger ever transferred to a 4-year institution, compared to 22 percent of students ages 19 to 21, and 8 percent of students age 22 or older.

<sup>16</sup>Supporting data for these figures are shown in appendix C, table C5. Analysis of differences in transfer rates by major field of study within each definition was also conducted; however, due to small cell sizes, few conclusions could be drawn.

Figure 5.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, by age and for various definitions of potential transfer



NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment). Categories not shown are based on too few cases for a reliable estimate.

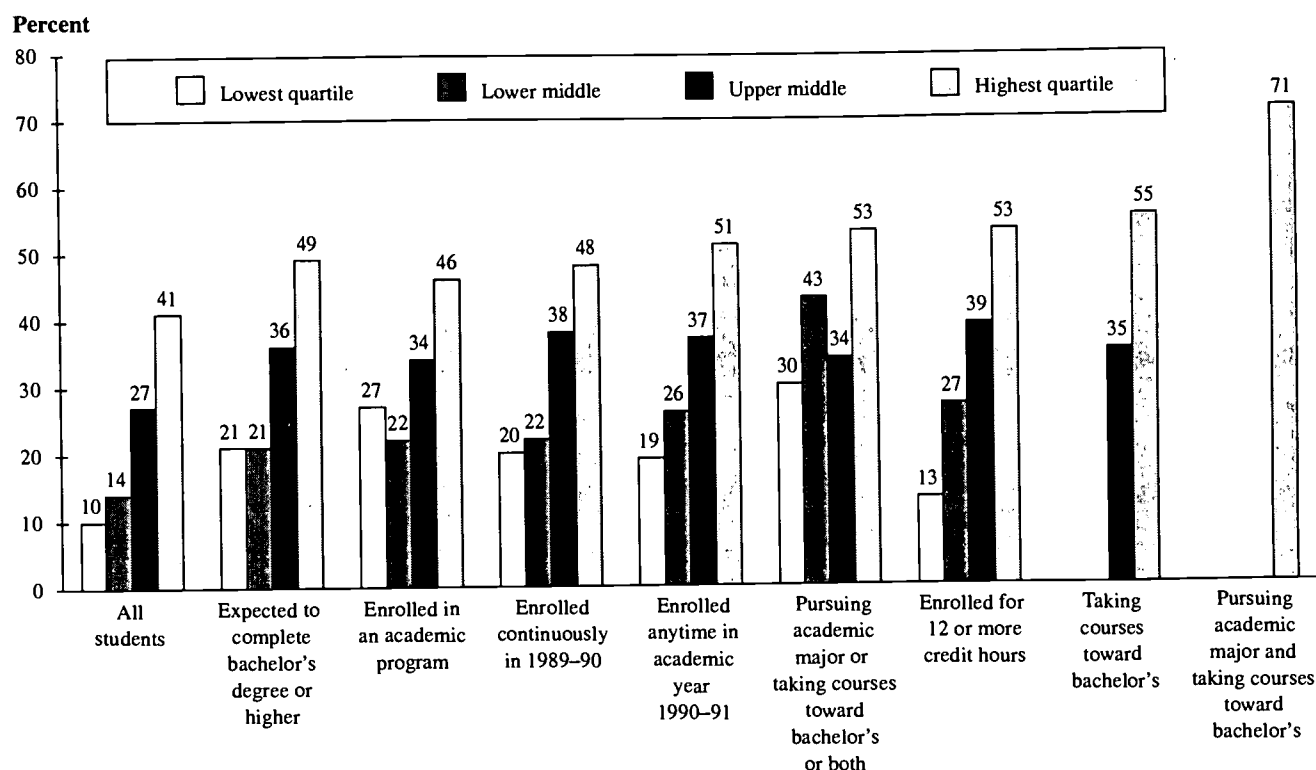
SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

These figures are useful because they reveal whether any differences in transfer rates across student groups remain when more restrictive definitions of potential transfer are applied to the sample. However, this approach to holding the definition of potential transfers constant while examining variations across student groups is limited by sample size. The number of cases in any given cell (e.g., students 22 years old or older who are taking courses toward a bachelor's degree) is often too small to produce an efficient estimate. As a result, some of the apparent differences across groups are not statistically significant. Still, some patterns are suggested.

For example, in general, the older the age group, the lower the percentage of students who transferred, regardless of the definition of potential transfer used (figure 5). Also, regardless of the potential transfer

definition used, higher SES was generally associated with a higher transfer rate (figure 6). For some potential transfer definitions, the transfer rate for first-generation students was similar to the rate for those whose parents attended a postsecondary institution, while the transfer rate for first-generation students was lower for other definitions (figure 7). Overall, first-generation students were less likely to transfer than those who were not; the same is true among students enrolled continuously, those enrolled anytime during 1990–91, and those enrolled for 12 or more credit hours. However, for the other definitions of potential transfer, the transfer rate for first-generation students and those whose parents attended a postsecondary institution was about the same. Finally, both male and female transfer rates increased with increasingly restrictive definitions of potential transfer (figure 8).

**Figure 6.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, by socioeconomic status and for various definitions of potential transfer**



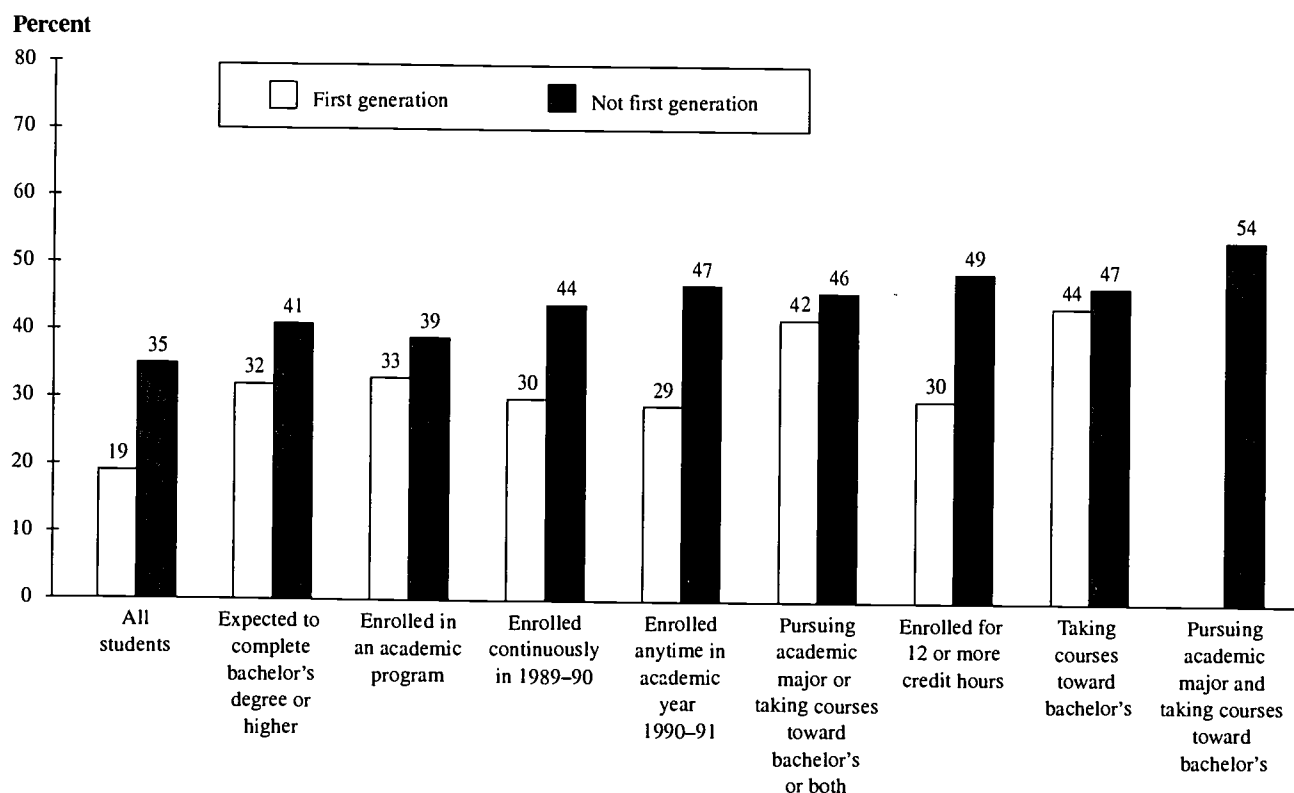
NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment). Categories not shown are based on too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.



Table C5 in appendix C also shows transfer rates by racial/ethnic subgroups and by region for students meeting each potential transfer definition. However, for several of the potential transfer definitions, there were not enough students in most racial/ethnic subgroups to estimate transfer rates, so comparing racial/ethnic patterns of transfer across definitions is not possible. In addition, it appears that generally across the set of potential transfer definitions, students in the Northeast had lower transfer rates than those in the other regions.

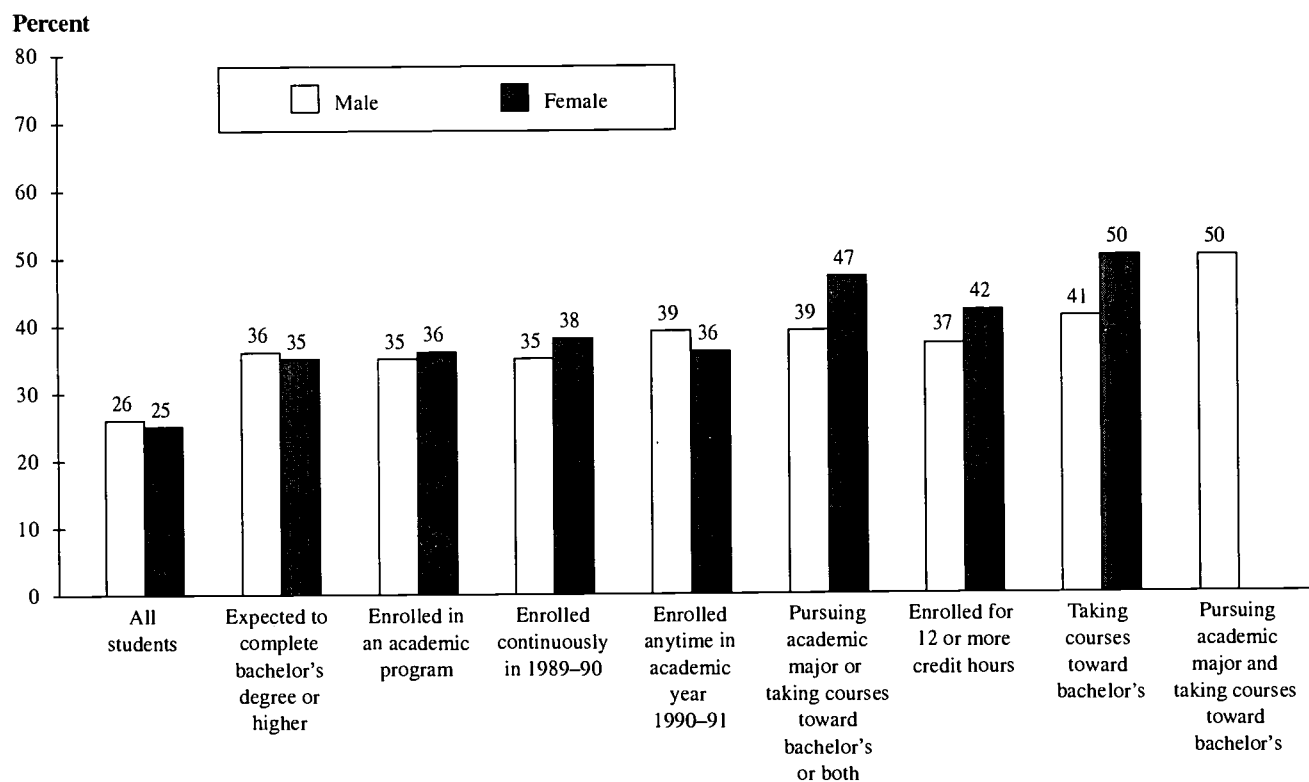
**Figure 7.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, by first-generation college status and for various definitions of potential transfer**



NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment). Categories not shown are based on too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

**Figure 8.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, by gender and for various definitions of potential transfer**



NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment). Categories not shown are based on too few cases for a reliable estimate.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

## DISCUSSION

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This study uses BPS data to explore various definitions of potential transfer: the percentage of community college students meeting each definition; the composition of the groups of students so defined and the variation among student subgroups in the proportion meeting each definition; and the actual transfer activity for different groups meeting these definitions. These results can be compared to the literature regarding two questions about community college students' transfer intentions and activities. First, what percentage of students in community colleges have educational expectations that include a bachelor's degree? This question is the basis for much of the debate surrounding the advantages and disadvantages of different ways of defining the pool of potential transfer students. Second, what is the transfer rate for community college students? The evidence from this report in response to these two questions is placed in the context of the literature, although this contextual information is not intended to constitute a statistical comparison across studies. The consequences for these questions of restricting the definition of potential transfer are discussed, and the section concludes with a consideration of the practical matter of operationalization.

However, any comparisons between the estimates presented in this report and those from other studies must be considered in light of differences in how the overall population of community college students is defined across studies. For example, BPS excluded students taking courses only for remedial or avocational purposes without receiving credit, while other estimates may include these students. As a result, the typical amount of remediation for students in BPS may underestimate, or otherwise differ from, the amount of remediation found among community college students in general—a factor that might be associated with transfer to a 4-year institution. Furthermore, this report focuses only on students enrolled in public 2-year colleges; including other less-than-4-year colleges, particularly less-than-2-year institutions, may lower the estimates. Finally, BPS data are restricted to first-time beginning postsecondary students; colleges conducting their own studies of transfer may include entering students who are not first-time beginners as defined in the BPS study.

### Educational Expectations and Potential Transfer

- *About 7 out of 10 beginning community college students explicitly stated educational expectations that included a bachelor's degree or higher, a somewhat higher rate than previous estimates.*

As noted previously, determining the percentage of students whose academic goals or expectations include a bachelor's degree has been difficult. Dougherty (1987, 1992) reviewed several studies and con-

cluded that 30 to 40 percent of all community college entrants aspire to a baccalaureate degree. He also noted the lack of nationally representative estimates and that the often-cited estimate of 70 percent for *full-time* students from the American Council of Education's annual first-year student survey is not representative of the full community college student population. In contrast, the BPS results reported here showed that about 71 percent of *all* first-time beginning community college students expect to earn a bachelor's degree. However, student aspirations could change appreciably from one cohort to the next, and estimates could therefore depend in part on when the survey was administered. Still, the overall estimate of 71 percent, which is based on a reasonably broad definition of "community college students," suggests that the academic expectations of these students are generally quite high.

- ***Using observed behaviors as indicators of transfer intent, anywhere from 11 to 68 percent of beginning community college students took such steps.***

Regarding the validity of self-reported student aspirations, Dougherty (1992) asked "whether one should take what students say as the only valid indication [of baccalaureate aspirations], even if those statements are not reflected in baccalaureate-oriented behavior, or whether one should only class as baccalaureate aspirants those who take concrete steps in this direction?" (p. 189, fn. 1). This report has tried to address this question partially by comparing different groups of potential transfer students, some defined by self-reports of expectations and others by indicators of "concrete steps," such as enrolling continuously during the first year of postsecondary study. The selection of a specific behavior or combination of behaviors that most accurately indicates baccalaureate orientation, however, is not obvious. Furthermore, the proportion of students taking each concrete step varies widely: for the various *behavioral* indicators of potential transfer, between 11 and 68 percent of students met each definition.

- ***With increasing restriction of the pool of potential transfer students, the group was more traditional and less representative of all beginning community college students.***

Restricting the population of potential transfer students based on various measures of intent could affect the representativeness of the pool compared to all community college students. Spicer and Armstrong (1996) examined the transfer rate in conjunction with the percentage of the initial cohort of students who met the definition used in the denominator. In the two districts they studied, less than 40 percent of the initial cohort met the Transfer Assembly definition of earning 12 credits within 4 years, while less than 4 percent met the most restrictive definition of the denominator. In this report, the percentage of first-time students meeting the various definitions of potential transfer ranged from 11 to 71 percent, with the least restrictive definition (apart from looking at all students) being educational expectations including a bachelor's degree or higher. As the share of the population of community college students became smaller, the characteristics of the group changed as well. For example, as the definition was restricted further, the group of potential transfer students was more traditional (younger, more likely to be dependents, and less likely to be working full time).

## Transfer Estimates

As with estimates of educational expectations, the transfer rate estimates from BPS in this report can be compared to those based on other datasets. Various approaches to defining the transfer rate have produced a wide range of transfer estimates. Cohen (1991) found that the estimated transfer rate ranged from 5 to 84 percent across different studies, depending on how the denominator was defined. Transfer estimates tended to be lowest when all community college students were used in the denominator and highest when the pool of potential transfers was restricted to students with transfer intentions who had also earned associate's degrees.

As noted above, the Transfer Assembly project tries to address the lack of a consistent definition of the transfer rate by providing a common method of calculating it that is readily estimated using data typically collected by community colleges. As of 1997, over 400 community colleges, enrolling more than 50 percent of all first-time community college students, participated in the project (Cohen and Sanchez 1997). The project found that among the 1988 cohort of beginning community college students who earned a minimum of 12 credit units in 4 years, about 22 percent had taken one or more classes at an in-state, 4-year college or university within 4 years of their initial enrollment—a rate that remained fairly stable across several subsequent cohorts (Cohen and Sanchez 1997).

Several researchers have used longitudinal surveys of high school cohorts to estimate transfer rates. Lee and Frank (1990), for instance, using the HS&B study, reported that 24 percent of students who entered community college within 2 years of graduating from high school in 1980 transferred to 4-year institutions within 4 years of graduating from high school.<sup>17</sup> Using the same dataset, Grubb (1991) found a transfer rate of 20 percent for all students, 25 percent for all students excluding those who completed fewer than 12 credits, and 34 percent for students who aspired to a bachelor's or graduate degree during their last year in high school. While the samples used in these national studies are representative of the high school cohort in a given year and capture all transfers (rather than only those to in-state, public institutions), they are not representative of all beginning community college students. Using BPS, McCormick (1997) found that 22 percent of all students who began at a community college in 1989–90 had transferred directly to a 4-year institution by 1994. Among those students who indicated in 1989–90 that they were taking courses leading toward a bachelor's degree, 39 percent had transferred to a 4-year institution by 1994.

Rather than using one or two approaches to calculating the transfer rate, some studies of specific community colleges or systems have presented several different estimates for the same cohort of students by varying how the denominator is defined. These studies, however, tend to use local or regional samples. Gutierrez-Marquez (1994), for example, examined transfer and other outcomes of over 10,000 beginning students who

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<sup>17</sup>High school graduates who entered a community college in the second year after graduating high school would have 3 or fewer years to transfer and be counted as such (rather than the 4 years included in several other studies of transfer).

entered the City Colleges of Chicago in fall 1986. Among all students, 13 percent had transferred to an in-state, 4-year institution by 1990.<sup>18</sup> The transfer rate ranged from 15.5 percent for students who were enrolled in baccalaureate/transfer programs to 19 percent using the Transfer Assembly definition, which restricts the denominator to students who completed at least 12 credit hours in 4 years.

Spicer and Armstrong (1996) applied 11 ways of defining the denominator to a cohort of beginning students enrolled in two California community college districts in fall 1988. The definitions ranged from including all students new to the institution to the most restrictive definition, which included “all first-time college students with a transfer goal who are transfer ready and who have completed at least fifty-six units” (Spicer and Armstrong 1996, 50). Spicer and Armstrong also examined the transfer rates of students who met the Transfer Assembly criteria, those who enrolled with a transfer goal, and students who were “transfer ready” (i.e., they had completed freshman English composition and mathematics courses transferable to a 4-year institution). In the first district, the estimated transfer rate ranged from 3.6 percent using the least restrictive denominator definition to 40.4 percent using the most restrictive definition, while the rate for the second district ranged from 5.3 to 61.3 percent. The Transfer Assembly definition yielded a transfer rate of around 13 percent for both districts.

- ***Approximating the pool of potential transfers as defined in previous studies, such as the Transfer Assembly model or high school cohorts, transfer rates in BPS appear to be a few percentage points higher than previous estimates.***

In general, the transfer rates found in this study appear to be somewhat higher than those from previous research. For example, while the *overall* transfer rate found in this study is comparable to the average estimate of 22 percent found by the Transfer Assembly project (Cohen and Sanchez 1997), both the numerator and denominator of the Transfer Assembly project are more restrictive: to be eligible, students must have earned a minimum of 12 credit units in 4 years, and transfers were to in-state, 4-year colleges or universities (Cohen and Sanchez 1997). Although BPS data do not facilitate use of this definition, this analysis approximated it by looking at those students who were enrolled for at least one term during the academic year following their initial enrollment (they had to have taken at least two classes in 2 years, compared to the Transfer Assembly criterion of about four classes in 4 years). This analysis found that 33 percent of students meeting this criterion transferred to a 4-year college or university within 5 academic years of their initial enrollment, which is somewhat higher than the rate resulting from the Transfer Assembly project. Using a slightly different approximation of the Transfer Assembly definition, the rate of *first* transfer to *public* 4-year institutions among beginning postsecondary students who enrolled in two consecutive academic years was 29 percent, still a few percentage points higher than the Transfer Assembly estimates.

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<sup>18</sup>It is not clear whether restrictions in this study included only for-credit students, only public school transfers, or for those in baccalaureate/transfer programs, only *initial* enrollment in such a program.



Comparisons with other studies for other definitions also suggest higher estimates. While the transfer rate obtained from a representative sample of community college students might be different from estimates based on a high school cohort, the overall estimate of 25 percent in this report is similar to the transfer rate of 20 to 24 percent for the high school class of 1980 (Grubb 1991; Lee and Frank 1990). However, the resulting transfer rate of 39 percent among students who were 18 years old or younger when they first enrolled in a community college is appreciably higher than the estimates based on 1980 high school graduates. This report replicated the estimates of first transfer rates for all beginning postsecondary students (22 percent) and for those taking courses leading toward a bachelor's degree (39 percent) provided by McCormick (1997) using the BPS dataset.

Finally, after reviewing numerous transfer studies, Dougherty (1994, 92) concluded that "the best estimate of the transfer rate of community college entrants is around 15 to 20%." Although the overall transfer rate estimate of 25 percent found in this report is somewhat higher than Dougherty's estimate, some of the discrepancy may be attributed to differences in definitions of community college students or transfer.

- ***As the pool of potential transfer students was restricted according to the various selection criteria, the transfer rate generally increased.***

This report also suggests some more general consequences of various choices of operationalization. For example, the results show that transfer rates were generally higher among potential transfer students as the definition became more restrictive. One explanation for this result, as suggested above, is that many students who report high educational expectations (the most inclusive of the restricted definitions of potential transfer) are not "committed enough" to the idea of earning a bachelor's degree to begin taking the necessary steps to obtain one. Alternatively, students' ability to transfer easily may vary from state to state, depending on articulation agreements that establish transfer credits or admissions policies facilitating transfer across levels of postsecondary education. Another explanation is that the difference in transfer rates may be due in part to a lack of resources among some students with bachelor's degree expectations, which may limit their ability to take the necessary steps to achieve a degree. Indeed, this report found that the proportion of students meeting each definition who had high SES increased as the definitions became more restrictive. Furthermore, some of the behavioral measures of academic intentions yield transfer rates similar to that of the self-reported measure, although they are somewhat more restrictive in terms of the percentage of the initial cohort meeting the criteria. Finally, there is some evidence that differences in transfer rates across various subgroups may not be accounted for by the definitions of potential transfer considered.

- ***As the definition of potential transfer became more restrictive, the percentage of actual transfer students meeting the selection criteria tended to decrease.***

To what extent do actual transfer students meet the criteria used to restrict the population to potential transfer students? Spicer and Armstrong (1996) investigated the percentage of transfer students captured by



the definitions of potential transfer they studied in two community college districts. In one district, with the exception of the “all students” definition, no more than 50 percent of transfer students were captured by any definition, while in the other district 88 percent or more of transfer students were captured by several of the definitions. In this report, the percentage of transfer students meeting the criteria for inclusion in the denominator declined significantly as the definition of potential transfer became more restrictive. While 95 percent of transfer students indicated educational expectations including the bachelor’s degree, about one in five (20.5 percent) had academic majors and were taking courses leading toward the bachelor’s degree.

## Operationalizing the Transfer Rate Denominator

This examination of alternative ways of defining the pool of potential transfer students was undertaken in part to inform research at the design stage. The purpose of the research, however, was not to recommend any particular definition as superior to all the others. Instead, the analysis contrasted these alternative definitions so that whatever choice is made for any specific research question can be understood in the context of other options of operationalization that could have been selected. Three examples illustrate this point. First, if the purpose of a particular analysis is to examine the effect of community college attendance on student outcomes, such as bachelor’s degree attainment, then it may be most useful to examine the transfer rates of students who expect to earn a bachelor’s degree or higher, as well as those who do not. Such an analysis does not ignore the fact that at least some students who did not expect to earn a bachelor’s degree or higher nevertheless transferred to a 4-year institution. Although the proportion who did so is relatively small (5 percent), this result is consistent with the hypothesis that community college attendance may raise some students’ expectations.

A second example further illustrates the point that the differences across definitions are not immediately evident from estimated transfer rates. The results of the analysis suggest that three of the definitions based upon enrollment—enrolled in an academic program, enrolled continuously in 1989–90, and enrolled anytime in academic year 1990–91—define groups of students whose transfer rates are similar to the rate for students who expected to earn a bachelor’s degree or higher (about 32 or 33 percent for first transfer; table 3). The percentages of students meeting these definitions, as well as the transfer rates of students *not* meeting these definitions, are also similar. These results suggest that definitions of potential transfer based upon certain enrollment characteristics are roughly comparable to the definition based upon students’ stated intent, which in some cases may be more difficult to obtain. However, while the aggregate numbers are comparable, the individual students comprising these groups vary. For example, for each enrollment-based definition, roughly one in five students did *not* express bachelor’s degree expectations (see appendix table C7). The underlying composition of the groups may vary with respect to other characteristics as well.

Finally, the more restrictive definitions may be useful in identifying a group of community college students comparable (in terms of major and degree program) to students who first enroll in 4-year institutions.

For example, one definition of potential transfer used in this analysis included students who indicated that they were pursuing academic majors or taking courses toward the bachelor's degree (or both). This definition excludes students with vocational majors taking courses leading to the associate's degree, as well as those students pursuing certificates. Because relatively few 4-year institutions offer vocational associate's degrees or certificates, this definition may maximize comparability across 2- and 4-year student populations in analyses of persistence and attainment. However, in the BPS:1990/1994 dataset, questions based on a student's major tended to have a higher than average number of missing values. Furthermore, while this definition resulted in a fairly high transfer rate (43 percent), about two-fifths (43 percent) of community college students met this definition, and it excluded about 30 percent of all transfer students. This definition illustrates the trade-off between restricting the pool of potential transfer students and excluding substantial portions of the initial cohort and actual transfer students.

Which definition (or definitions) is most appropriate for addressing a *specific research question*? The decision is not straightforward. Just as any statistic depends on the specific variables used to indicate the underlying concepts, the transfer rate for community college students is rather sensitive to the specification of potential transfer. The most complete picture is provided by using multiple indicators, but this approach is not always practical. If data collection costs or other constraints permit only one definition, one strategy is to define the group of potential transfer students broadly enough so that it still generally reflects community college students, while not being so broad as to include students who never harbor plans to transfer to a 4-year college. This study presents several alternatives with different advantages and disadvantages.

Overall, the results of this study provide national estimates of community college students' academic expectations and transfer activity. These estimates refine and update our understanding of students' intentions and paths to transfer. Selecting an approach to defining the pool of potential transfer students is a necessary first step in any effort to analyze the impact of institution type on persistence and attainment. This report has taken a step back and analyzed the definition itself by examining several alternative approaches using a complete nationally representative sample. While the results do not demonstrate the superiority of any single definition, they sharpen one's appreciation for the consequences of measurement decisions and build a firmer foundation for future work on this population. Such work will be facilitated by the completion of the newest panel of the 1995–96 BPS, with follow-ups in 1998 and 2001. This new data source includes data on students' explicit transfer intentions and expectations of degree completion at the first institution attended (Berkner, Horn, and Clune 2000). This additional information, also available in a nationally representative sample, has the potential to substantially enrich our understanding of potential transfer populations.

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## APPENDIX A—GLOSSARY

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This glossary describes the variables used in this report. These variables were selected directly from the Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994) Data Analysis System (DAS), an NCES software application that generates tables directly from the BPS:1990/1994 data files. A description of the DAS files can be found in appendix B. The variables are organized in alphabetical order by label used in the report. The BPS:1990/1994 variable label is indicated to the right of each entry in the glossary. The index below groups the variables as they are used in the report.

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Expected to complete bachelor's degree or higher .....	44
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Enrolled for 12 or more credit hours .....	43
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#### *Other Student Characteristics*

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***Age as of 12/31/89***

**AGE**

Student's age as of 12/31/89. Ages in years were grouped as follows:

- 18 or below
- 19 through 21
- 22 and above
  - 22 through 24
  - 25 through 34
  - 35 through 44
  - 45 and above

***Attendance intensity***

**ATTEND**

Whether student attended the institution full time or less than full time during the sampled 1989–90 term.

- Full time
- Less than full time

***Campus participation index***

**CLIMINDX**

Overall participation index of activities the student reported doing during the 1989–90 academic year either “sometimes” or “often.” Activities included attending career-related lectures, having informal contact with faculty members, participating in student assistance centers/programs, participating in study groups, meeting advisors about academic plans, participating in intramurals, participating in school clubs, talking about academics with faculty, and going out with school friends. Possible scores as coded in the DAS range from 0 to 9. Scores were grouped into the following categories:

- 2 or below
- 3–4
- 5–6
- 7 or above

***Delayed enrollment after high school***

**DELAYENR**

Indicates whether or not the student delayed postsecondary education following high school graduation. Those who graduated earlier than 1989, or who did not receive a regular high school diploma, were considered to have delayed enrollment.

***Dependency status*****DEPEND**

Indicates whether the student was considered a dependent or independent student for financial aid purposes in academic year 1989–90.

***Enrolled anytime in academic year 1990–91*****ENAY8990**

Indicates whether or not the student enrolled in a postsecondary institution at any time during the 1990–91 academic year. Students who were enrolled at some point during 1990–91 were included in this pool of potential transfers. Some students meeting this definition may have already left the community college in which they first enrolled.

***Enrolled continuously in 1989–90*****ST8990**

Indicates the student's continuous full-time or part-time enrollment during 1989–90. Students classified as having "continuous full-time" or "other continuous" enrollment were included in this pool of potential transfer students.

***Enrolled for 12 or more credit hours*****CREDHRS**

This DAS variable indicates the number of semester hours for which the student was enrolled during the primary term. Quarter hours were converted to semester hours by multiplying by 2/3. Students who had enrolled for 12 or more credit hours were included in this pool of potential transfer students.

***Enrolled in an academic program*****VOCA8990**

This variable was derived based on the student's report of whether his/her program of study was primarily academic or vocational. The question was asked during the first follow-up in the spring of 1992 for each previous term of postsecondary enrollment, and a value was assigned for 1989–90 based on the student's response for the earliest term queried. Students who reported being in an academic program were included in this pool of potential transfer students.

***Ever transferred to 4-year*****EVER4YR**

Classifies the student according to whether he/she ever attended a 4-year postsecondary institution as of the second follow-up in spring 1994. Those who had were included in the calculation of this transfer rate.



***Expected to complete bachelor's degree or higher***

**EXEDCOL**

This variable is based on the student's response to the question, "What is the highest level of education you ever expect to complete?" Students responding that they expected to receive a bachelor's degree, master's degree or equivalent, Ph.D., M.D., or other advanced professional degree were included in this pool of potential transfer students.

***First-generation college status***

**RPARED**

This variable indicates whether the student was the first generation to enter postsecondary education, based on the higher of the parents' educational attainment. Students whose parents had not taken any postsecondary education were considered first-generation students.

***First transferred to 4-year***

**TRANTO**

This variable classifies the institutional level of the first institution the student enrolled in after leaving the institution at which he/she was sampled for participation in the study. For this report, students whose first transfer was to a public or private 4-year institution were included in the calculation of this transfer rate, versus all others, including those transferring to other institution types or never enrolling in a different institution.

***Gender***

**H\_GENDR**

Indicates whether the student was male or female.

***Hours worked per week***

**EMWKHR2**

This variable calculates the average hours worked per week between 07/01/89 and 06/30/90 for all students (including those who did not work). If a student was employed (including college work-study and any assistantships) during a given month, the average number of hours worked per week across all jobs held during the month was derived based on the start and end dates and the average hours worked per week for each job as reported during the interview. This estimate was calculated as follows: 1) determine the average number of hours per week a student worked during each month; 2) sum the average hours per week across 12 months; and 3) divide by 12 months. For example, if a student worked 40 hours per week for 3 months during the year and did not work during the remaining 9 months, his/her value for this variable would be 10  $[(40+40+40)/12]$ . Therefore, this variable indicates the number of hours worked per week averaged over a 12-month period. For this report, responses were grouped as follows:



Fewer than 35  
35 or more

***Pursuing an academic major and taking courses toward bachelor's***

**MAJDEG89**

This variable is based on two survey questions. The first is “What is your major?” (at the institution in which the student first enrolled). Students reporting a major in humanities, social and behavioral science, life sciences, physical sciences, mathematics, or education were considered to be pursuing an academic major. Students reporting a major in computer and information technology, engineering, business and management, health, vocational/technical, or other technical/professional program were considered to be pursuing a vocational degree. The second component of this variable is based on the question, “Toward which degree or other award are the courses you are taking leading?” (See “Taking courses toward bachelor's,” below.) Students' major type was cross-classified with the type of credential they indicated they were working on. For this report, students whose category for MAJDEG89 was academic bachelor's degree were included in this pool of potential transfer students.

***Pursuing academic major or taking courses toward bachelor's or both***

**MAJDEG89**

This variable is based on the same DAS variable as the previous entry. However, it is more inclusive. Students whose category for MAJDEG89 was reported as academic bachelor's degree, academic associate's degree, or vocational bachelor's degree were included in this pool of potential transfer students. Thus, students with academic majors who indicated they were pursuing the associate's degree or higher, as well as those working on the bachelor's degree in vocational majors, were included.

***Race/ethnicity***

**BPSRACE**

Indicates the student's racial/ethnic background in the following five categories: white, non-Hispanic; black, non-Hispanic; Hispanic; Asian/Pacific Islander; or American Indian/Alaskan Native.

***Ratio of aid to price***

**AIDRTIO2**

Ratio of total aid to attendance-adjusted, student-reported price. This variable adjusts for non-tuition charges of part-time and independent students so that the monthly expenses of the household included in educational charges are limited to the student and related to attendance intensity. The total price is reduced by one-fourth of the sum of the room, board, and other off-campus expenses for part-time students attending half time or

more, and by three-fourths for those attending less than half time. This provides a total price of attendance amount that more closely reflects the assumptions used in awarding financial aid. For this report, responses were grouped as follows:

Zero  
1–33 percent  
34–67 percent  
68–100 percent

***Received financial aid***

**AID8990**

Indicates whether or not the student received financial aid during the 1989–90 academic year.

***Region of institution***

**OBEREG**

The region of the student's 1989–90 institution at which he/she was sampled for participation in the study. Although students from outlying areas were included in the study, there were no such students attending public 2-year institutions. The following categories were used:

Northeast  
    New England  
    Mid East  
Midwest  
    Great Lakes  
    Plains  
South  
    Southeast  
    Southwest  
West  
    Rocky Mountains  
    Far West

***Self-rated academic ability***

**COMPAREA**

Student's self-rating during his/her first postsecondary term of his/her academic ability in response to the following question as part of a series: "Compared with the average person of your age, would you rate yourself as above average, average, or below average in... academic ability?"

***Self-rated mathematical ability*****COMPAREF**

Student's self-rating during his/her first postsecondary term of his/her mathematical ability in response to the following question as part of a series: "Compared with the average person of your age, would you rate yourself as above average, average, or below average in... mathematical ability?"

***Single parent*****SINGLPAR**

Indicates whether or not the student was a single parent as of academic year 1989–90, based on the student's marital status, dependency status, and whether or not the student reported having dependents other than a spouse. Students who were themselves dependent were not counted as single parents.

***Socioeconomic status*****SESPERC**

Students' socioeconomic status in academic year 1989–90. Composite variable combining parents' occupation (father/mother), things in the home (dishwasher, VCR), and dependents' family income. Percentiles for this composite variable were grouped into quartiles for this report:

Lowest quartile  
Lower middle  
Upper middle  
Highest quartile

***Taking courses toward bachelor's*****GOAL8990**

This variable is based on the question, "Toward which degree or other award are the courses you are taking leading?" Those who indicated that their coursework was leading toward a bachelor's degree were included in this pool of potential transfer students.

***Took remedial math in 1989–90*****REMMATH**

Student's response to a question about whether he/she had taken any remedial math from July 1, 1989, until the survey. The DAS variable is a continuous variable indicating the number of hours of remedial math taken; for this study, the responses were collapsed into the following categories:

No  
Yes

Took no hours  
Took at least 1 hour

## APPENDIX B—TECHNICAL NOTES AND METHODOLOGY

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### Beginning Postsecondary Students Longitudinal Study

The need for a nationally representative database on postsecondary student financial aid prompted the U.S. Department of Education to initiate the National Postsecondary Student Aid Study (NPSAS), a cross-sectional survey conducted every 3 years starting in 1987. The NPSAS sample was designed to include students enrolled in all types of postsecondary education. However, service academies were not included in the institution sample because of their unique funding and tuition base, and certain other institutions were also excluded.<sup>19</sup> In addition to a computer-assisted telephone interview (CATI) of students and parents, the NPSAS surveys collect students' registration and financial aid information directly from the sampled institutions. To provide the full range of information on financing postsecondary education, NPSAS samples both aided and nonaided students.

The Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994) followed students from the NPSAS:1990 sample who were identified as first-time beginning students in academic year 1989–90. A CATI was conducted with these students 2 and 4 years after the base year study that collected information concerning enrollment, program completion, education financing, employment, and family formation; graduate school access and enrollment; and civic participation. The data derived from this survey permit a variety of analyses concerning postsecondary persistence and completion, entry into the work force, and civic participation.

Unlike other NCES longitudinal surveys based on grade-specific cohorts (such as High School and Beyond), the BPS design allows for the increasing numbers of nontraditional postsecondary students, such as those who have delayed their education due to financial needs or family responsibilities. Students who began their postsecondary studies before 1989–90, stopped out, and then returned to their studies in 1989–90 were not included, nor were students still enrolled in high school.

The NPSAS and BPS survey samples, while representative and statistically accurate, are not simple random samples. Instead, the samples are selected using a more complex three-step procedure with stratified samples and differential probabilities of selection at each level. First, postsecondary institutions are selected within geographic strata. Once institutions are organized by zip code and state, they are further stratified by control (i.e., public; private, not-for-profit; or private, for-profit) and degree offering (less-than-2-year, 2- to 3-year, 4-year nondoctorate-granting, and 4-year doctorate-granting).

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<sup>19</sup>Other excluded institutions were those offering only avocational, recreational, or remedial courses; only in-house business courses; only programs of less than 3 months' duration; or only correspondence courses.

For more information on BPS:1990/1994, consult the *Beginning Postsecondary Students Longitudinal Study Second Follow-up (BPS:90/94) Final Technical Report* (Pratt et al. 1996).

## Accuracy of Estimates

The statistics in this report are estimates derived from a sample. Two broad categories of error occur in such estimates: sampling and nonsampling errors. Sampling errors occur because observations are made only on samples of students, not on entire populations. Nonsampling errors occur not only in sample surveys, but also in complete censuses of entire populations.

Nonsampling errors can be attributed to a number of sources: inability to obtain complete information about all students in all institutions in the sample (e.g., some students or institutions refused to participate, or students participated but answered only certain items); ambiguous definitions; differences in interpreting questions; inability or unwillingness to give correct information; mistakes in recording or coding data; and other errors of collecting, processing, sampling, and imputing missing data.

## Data Analysis System

The estimates presented in this report were produced using the BPS:1990/1994 Data Analysis System (DAS). The DAS software makes it possible for users to specify and generate their own tables from BPS data. With the DAS, users can replicate or expand upon the tables presented in this report. In addition to the table estimates, the DAS calculates proper standard errors<sup>20</sup> and weighted sample sizes for these 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, the DAS will also produce a correlation matrix of selected variables to be used for linear regression models. Included in the output with the correlation matrix are the design effects (DEFTs) for each variable in the matrix. Since statistical procedures generally compute regression coefficients based on simple random sample assumptions, the standard errors must be adjusted with the design effects to take into account the BPS stratified sampling method.

The DAS can be accessed electronically at [www.PEDAR-DAS.org](http://www.PEDAR-DAS.org). For more information about the BPS:1990/1994 DAS, contact:

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<sup>20</sup>The BPS sample is not a simple random sample; therefore, simple random sample techniques for estimating sampling error cannot be applied to these data. The DAS takes into account the complexity of the sampling procedures and calculates standard errors appropriate for such samples. The method for computing sampling errors used by the DAS involves approximating the estimator by the linear terms of a Taylor series expansion. The procedure is typically referred to as the Taylor series method.

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## Statistical Procedures

Two types of statistical procedures were employed in this report: testing differences between two estimates and testing for linear trends in estimates across a set of ordered categories. Each procedure is described below.

### *Differences Between Estimates*

The descriptive comparisons were tested in this report using the 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 the differences between each pair of means or proportions, and comparing these with published tables of significance levels for two-tailed hypothesis testing. The 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. If the comparison is between the mean of a subgroup and the mean of the total group, the following formula is used:

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

where  $p$  is the proportion of the total group contained in the subgroup. When comparing two percentages from a distribution that adds to 100 percent, the following formula is used:

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

where  $r$  is the correlation between the two estimates. 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 students in the specific categories used for comparison. Hence, a small difference compared across a large number of students would produce a large  $t$  statistic.

A second hazard in reporting statistical tests for each comparison occurs when making multiple comparisons among categories of an independent variable. For example, when making paired comparisons across different racial/ethnic groups, the probability of a Type I error for these comparisons taken as a group is larger than the probability for a single comparison. When more than one difference between groups of related characteristics or “families” is tested for statistical significance, one must apply a standard that assures a level of significance for all of those comparisons taken together. Comparisons were made in this report only when  $p < .05/k$  for a particular pairwise comparison, where that comparison was one of  $k$  tests within a family. This guarantees both that the individual comparison would have  $p < .05$  and that for  $k$  comparisons within a family of possible comparisons, the significance level for all the comparisons will sum to  $p < .05$ .<sup>21</sup>

For example, in a comparison of the percentages of males and females who enrolled in postsecondary education, only one comparison is possible (males versus females). In this family,  $k=1$ , and the comparison can be evaluated without adjusting the significance level. When students are divided into five racial/ethnic groups and all possible comparisons are made, then  $k=10$  and the significance level of each test must be  $p < .05/10$ , or  $p < .005$ . The formula for calculating family size ( $k$ ) is as follows:

$$k = \frac{j(j-1)}{2} \quad (4)$$

---

<sup>21</sup>The standard that  $p < .05/k$  for each comparison is more stringent than the criterion that the significance level of the comparisons should sum to  $p < .05$ . For tables showing the  $t$  statistic required to ensure that  $p < .05/k$  for a particular family size and degrees of freedom, see Dunn (1961).

where  $j$  is the number of categories for the variable being tested. In the case of race/ethnicity, there are five racial/ethnic groups (American Indian/Alaskan Native; Asian/Pacific Islander; black, non-Hispanic; Hispanic; and white, non-Hispanic), so substituting 5 for  $j$  in equation 4,

$$k = \frac{5(5-1)}{2} = 10 \quad (5)$$

### *Linear Trends*

When comparing estimates across a family of three or more categories that are ordered, however, such as SES quartiles, it is possible to test whether the estimates may also be ordered more efficiently than with a series of paired comparisons.

When proportions were examined relative to a variable with ordered categories, the Student's  $t$ -test was applied to a measure of a linear trend. The test involves estimating a simple linear regression with a variable representing the order of the categories as the independent variable (e.g., SES quartile), and the proportion of interest (e.g., the percentage who enrolled for 12 or more credits) as the dependent variable. Before estimating the regression, the data must be adjusted by the design effects to account for the complex sample design. The  $t$  statistic is calculated as the ratio of the regression coefficient to its standard error. If  $t$  is greater than 1.96 (the critical value of  $t$  at a significance level of .05), there is evidence of a linear relationship between the two variables.<sup>22</sup>

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<sup>22</sup>For more information about this modification of Student's  $t$ -test, see Snedecor and Cochran (1967, 246–247). For more information about linear regression, see Lewis-Beck (1980).



## APPENDIX C—SUPPLEMENTAL AND STANDARD ERROR TABLES

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Table C1.—Standard errors for table 1: Percentage distributions within potential transfer categories of 1989–90 beginning postsecondary students enrolled at public 2-year institutions according to various student and institution characteristics

Characteristic	Total	Expected to complete bachelor's degree or higher			Enrolled in an academic program			Enrolled continuously in 1989-90			Enrolled anytime in academic year 1990-91			Pursuing academic major or taking courses toward bachelor's or both			Enrolled for 12 or more credit hours toward bachelor's			Taking courses toward bachelor's			Pursuing academic major and taking courses toward bachelor's		
		†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	†	
Age as of 12/31/89																									
18 or below	2.33	2.56	2.64	2.84	2.77	3.03	3.36	3.73	6.99																
19 through 21	1.80	2.28	2.37	2.38	2.22	2.74	2.70	3.50	6.79																
22 or above	2.43	2.15	2.17	2.31	2.54	2.26	2.43	2.55	3.79																
22 through 24	1.06	1.21	0.98	1.10	1.16	1.06	1.15	1.47	2.18																
25 through 34	1.39	1.38	1.52	1.54	1.50	1.66	1.57	1.94	3.17																
35 through 44	0.91	0.95	1.09	1.14	1.10	1.11	1.06	1.28	†																
45 or above	0.83	0.46	0.70	0.63	0.63	0.51	0.44	†	†																
Socioeconomic status																									
Lowest quartile	1.67	1.54	1.68	1.75	1.75	1.90	2.12	2.48	3.36																
Lower middle	1.79	2.26	2.39	1.94	2.27	2.79	1.99	3.20	4.02																
Upper middle	1.87	2.28	2.72	2.25	2.38	3.12	3.14	3.93	6.82																
Highest quartile	1.75	2.27	2.59	2.27	2.17	3.19	3.39	3.98	7.16																
First-generation college status																									
First generation	2.18	2.41	2.76	2.53	2.50	3.31	3.40	4.16	6.44																
Not first generation	2.18	2.41	2.76	2.53	2.50	3.31	3.40	4.16	6.44																
Gender																									
Male	2.21	2.59	2.78	2.81	2.69	3.31	3.41	4.19	7.01																
Female	2.21	2.59	2.78	2.81	2.69	3.31	3.41	4.19	7.01																
Race/ethnicity																									
White, non-Hispanic	2.26	2.67	2.76	2.54	2.72	3.75	2.86	4.29	6.59																
Black, non-Hispanic	1.30	1.57	1.46	1.22	1.39	2.00	1.65	1.94	†																
Hispanic	1.63	1.78	1.94	1.77	2.14	2.69	2.15	3.07	5.81																
Asian/Pacific Islander	0.78	1.03	1.15	1.03	1.13	1.80	1.46	2.37	3.97																
American Indian/Alaskan Native	0.32	0.46	0.46	0.48	0.43	0.76	0.42	0.87	1.80																

Table C1.—Standard errors for table 1: Percentage distributions within potential transfer categories of 1989–90 beginning postsecondary students enrolled at public 2-year institutions according to various student and institution characteristics—Continued

Characteristic	Total	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or			Pursuing academic major and taking courses toward bachelor's
						taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	
Region of institution									
Northeast	4.04	4.14	4.31	3.61	3.97	4.86	4.77	4.18	4.22
New England	2.35	1.93	2.08	1.44	1.62	1.45	2.36	1.40	1.59
Mid East	3.67	3.93	4.06	3.48	3.82	4.78	4.48	4.02	3.96
Midwest	3.29	3.62	3.85	3.26	3.65	4.30	4.31	5.66	5.02
Great Lakes	2.94	3.26	3.68	2.94	3.43	4.02	3.84	5.53	4.63
Plains	1.86	1.96	1.45	1.70	1.72	2.06	2.44	2.30	2.22
South	3.69	4.02	4.34	3.97	4.13	4.68	4.70	5.18	5.41
Southeast	3.29	3.56	3.99	3.65	3.64	4.31	4.11	4.46	4.67
Southwest	2.09	2.29	2.05	1.99	2.42	2.01	2.58	2.69	3.26
West	3.68	3.99	4.37	3.84	4.08	4.89	4.35	5.66	6.98
Rocky Mountains	0.94	0.80	1.02	1.13	1.03	1.31	1.39	1.34	2.25
Far West	3.67	3.99	4.38	3.83	4.06	4.90	4.24	5.64	7.05
Self-rated academic ability									
Above average	1.71	2.16	2.31	2.16	2.23	2.99	2.66	3.76	6.49
Average	1.83	2.22	2.46	2.35	2.35	3.09	2.74	3.90	6.57
Below average	0.60	0.72	0.77	0.75	0.73	0.95	0.81	0.93	1.81
Self-rated mathematical ability									
Above average	1.62	2.13	2.33	2.19	2.06	3.00	2.91	3.68	5.49
Average	1.81	2.34	2.50	2.24	2.32	3.16	3.19	3.70	6.54
Below average	1.39	1.91	2.00	1.93	1.96	2.80	2.31	3.25	5.77
Took remedial math in 1989–90									
No	1.53	1.96	1.95	1.69	1.86	3.00	2.02	3.67	2.99
Yes	1.53	1.96	1.95	1.69	1.86	3.00	2.02	3.67	2.99
Delayed enrollment after high school									
No	2.42	2.63	2.43	2.56	2.58	2.87	3.30	3.53	6.68
Yes	2.42	2.63	2.43	2.56	2.58	2.87	3.30	3.53	6.68

Table C1.—Standard errors for table 1: Percentage distributions within potential transfer categories of 1989–90 beginning postsecondary students enrolled at public 2-year institutions according to various student and institution characteristics—Continued

Characteristic	Total	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or		Pursuing academic major and taking courses toward bachelor's
						taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	
Attendance intensity								
Full time	2.53	3.00	3.21	2.91	2.98	3.95	1.04	6.95
Less than full time	2.53	3.00	3.21	2.91	2.98	3.95	1.04	6.95
Campus participation index								
2 or below	2.11	2.35	2.24	2.25	2.19	2.76	3.11	5.70
3–4	2.24	2.72	2.54	2.58	2.70	3.90	3.33	7.07
5–6	1.61	2.26	2.20	1.99	2.05	3.11	2.80	5.87
7 or above	1.21	1.57	1.61	1.66	1.56	2.05	2.27	3.81
Single parent								
No	1.09	0.94	1.12	0.91	1.07	0.98	1.16	2.00
Yes	1.09	0.94	1.12	0.91	1.07	0.98	1.16	2.00
Dependency status								
Dependent	2.37	2.16	2.29	2.38	2.48	2.50	2.54	4.30
Independent	2.37	2.16	2.29	2.38	2.48	2.50	2.54	4.30
Hours worked per week								
Fewer than 35	2.05	2.49	2.27	2.29	2.53	3.25	2.13	5.41
35 or more	2.05	2.49	2.27	2.29	2.53	3.25	2.13	5.41
Received financial aid								
No	2.10	2.23	2.53	2.50	2.49	3.04	3.83	4.35
Yes	2.10	2.23	2.53	2.50	2.49	3.04	3.83	4.35

Table C1.—Standard errors for table 1: Percentage distributions within potential transfer categories of 1989–90 beginning postsecondary students enrolled at public 2-year institutions according to various student and institution characteristics—Continued

Characteristic	Total	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or			Pursuing academic major and taking courses toward bachelor's		
						taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's
Ratio of aid to price*											
No aid	2.09	2.24	2.47	2.48	2.46	2.98	3.79	3.27	4.31		
1–33 percent	1.44	1.52	1.73	1.75	1.73	2.03	2.96	2.19	3.51		
34–67 percent	0.89	1.15	1.07	1.18	1.15	1.63	1.57	2.04	2.21		
68–100 percent	0.90	1.12	1.12	1.22	1.19	1.40	1.77	1.03	2.09		

†Not applicable.

\*Price adjusted for attendance intensity. See the glossary (appendix A) for details.

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS: 1990/1994), Data Analysis System.

Table C2.—Standard errors for table 2: Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by various student and institution characteristics

Characteristic	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's
Total	2.06	2.22	2.39	2.03	2.34	2.30	1.93	1.25
Age as of 12/31/89								
18 or below	2.69	2.49	3.47	2.86	3.30	3.30	2.79	2.05
19 through 21	3.28	4.03	4.38	3.55	3.98	3.83	3.34	3.01
22 or above	4.06	4.05	4.71	3.67	3.50	3.05	2.35	1.54
22 through 24	7.44	8.93	9.68	8.17	8.15	6.17	5.89	4.27
25 through 34	6.44	6.77	6.32	5.54	5.65	4.24	4.13	2.71
35 through 44	7.11	8.72	9.38	8.25	7.03	5.69	4.89	†
45 or above	—	—	—	—	—	—	—	—
Socioeconomic status								
Lowest quartile	4.54	5.43	5.56	4.35	4.27	4.13	3.19	2.08
Lower middle	4.79	5.00	5.13	4.84	4.60	3.32	3.74	1.96
Upper middle	3.77	3.95	4.41	3.49	3.85	4.29	3.20	2.55
Highest quartile	2.89	2.98	3.47	2.64	3.86	3.83	3.72	2.93
First-generation college status								
First generation	3.15	3.40	3.09	2.94	3.30	3.01	2.73	1.55
Not first generation	2.27	2.70	2.71	2.61	3.11	3.16	2.70	2.26
Gender								
Male	2.77	3.22	3.52	2.82	3.63	3.27	2.95	2.06
Female	2.95	3.11	3.18	2.83	2.96	2.87	2.44	1.65
Race/ethnicity								
White, non-Hispanic	2.44	2.45	2.83	2.44	2.67	2.57	2.28	1.36
Black, non-Hispanic	5.19	6.81	7.69	7.16	6.69	6.51	4.87	†
Hispanic	5.83	5.75	8.14	6.05	8.01	6.49	5.85	5.26
Asian/Pacific Islander	—	—	—	—	—	—	—	—
American Indian/ Alaskan Native	—	—	—	—	—	—	—	—

Table C2.—Standard errors for table 2: Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by various student and institution characteristics—Continued

Characteristic	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's
Region of institution								
Northeast	4.29	3.98	5.71	4.59	4.92	4.28	3.19	1.69
New England	8.82	—	—	6.25	—	13.64	—	—
Mid East	4.22	4.55	5.66	4.97	5.36	3.52	3.88	1.76
Midwest	5.29	5.39	4.82	4.55	5.47	5.34	5.17	2.40
Great Lakes	6.45	6.95	5.81	5.91	7.36	6.12	7.19	3.15
Plains	9.42	6.12	8.45	6.81	6.87	10.59	4.09	3.33
South	3.53	4.93	4.34	3.48	4.59	4.51	3.29	1.78
Southeast	4.45	5.90	4.35	4.08	5.82	5.28	3.85	2.20
Southwest	5.13	8.05	10.53	5.68	6.11	8.11	5.54	3.47
West	3.52	3.33	4.76	3.80	3.97	3.99	3.31	2.74
Rocky Mountains	—	—	—	—	—	—	—	—
Far West	3.54	3.48	5.06	4.10	4.20	4.18	3.54	2.93
Self-rated academic ability								
Above average	3.16	3.77	3.88	3.30	4.16	3.84	3.74	3.00
Average	2.66	2.51	2.93	2.42	2.86	2.67	2.31	1.49
Below average	—	—	—	—	—	—	—	—
Self-rated mathematical ability								
Above average	3.59	3.82	4.06	3.98	4.21	4.36	3.90	2.81
Average	2.92	2.92	3.01	2.55	2.94	2.92	2.08	1.57
Below average	3.76	4.48	5.47	4.92	5.78	4.49	4.59	3.66
Took remedial math in 1989–90								
No	2.19	2.28	2.63	2.16	2.36	2.39	1.79	1.39
Yes	4.71	5.57	6.78	6.38	7.06	5.99	6.85	2.63
Delayed enrollment after high school								
No	2.30	2.46	2.71	2.44	3.05	3.11	2.49	1.73
Yes	3.43	3.34	3.75	2.86	3.10	2.75	2.40	2.00



Table C2.—Standard errors for table 2: Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by various student and institution characteristics—Continued

Characteristic	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both		Pursuing academic major and taking courses toward bachelor's	
					Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Enrolled for 12 or more credit hours	Taking courses toward bachelor's
Attendance intensity								
Full time	2.37	2.72	2.42	2.66	3.00	2.58	3.85	1.92
Less than full time	3.25	3.32	3.68	3.00	3.59	2.90	0.73	1.72
Campus participation index								
2 or below	4.03	3.79	3.70	3.59	3.82	2.63	3.25	1.91
3–4	3.09	3.36	3.74	3.63	4.22	3.77	4.08	2.49
5–6	4.10	4.47	4.33	4.10	5.08	4.87	4.72	3.10
7 or above	5.15	6.38	5.29	6.22	7.38	5.85	6.98	3.85
Single parent								
No	1.99	2.26	2.34	2.10	2.48	2.04	2.31	1.31
Yes	8.58	8.33	8.96	6.25	6.49	5.50	6.42	3.63
Dependency status								
Dependent	2.02	2.31	2.77	2.32	2.75	2.41	2.81	1.70
Independent	3.66	3.80	4.15	3.14	3.45	2.35	2.77	1.45
Hours worked per week								
Fewer than 35	2.30	2.28	2.55	2.37	2.57	2.41	2.72	1.63
35 or more	4.48	4.20	4.24	3.70	4.56	3.05	2.61	1.89
Received financial aid								
No	2.40	2.46	2.83	2.35	2.93	2.42	2.47	1.56
Yes	3.40	3.73	3.46	3.25	3.61	2.74	4.46	1.68

Table C2.—Standard errors for table 2: Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage of initial cohort meeting each definition of potential transfer, by various student and institution characteristics—Continued

Characteristic	Expected to complete bachelor's degree or higher	Pursuing academic major or taking courses toward bachelor's				Pursuing academic major and taking courses toward bachelor's
		Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Enrolled for 12 or more credit hours	
Ratio of aid to price*						
No aid	2.41	2.42	2.83	2.35	2.92	2.44
1–33 percent	4.58	4.66	4.62	4.11	4.78	3.48
34–67 percent	5.67	6.93	6.84	6.41	8.00	6.70
68–100 percent	6.73	7.97	6.41	7.06	7.05	3.87
						1.57
						2.41
						3.65
						3.16

†Not applicable.

— Too few cases for a reliable estimate.

\*Price adjusted for attendance intensity. See the glossary (appendix A) for details.

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Table C3.—Standard errors for table 3: Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, for various definitions of potential transfer

Potential transfer definition	First transferred to 4-year	Ever transferred to 4-year
All students	1.73	1.80
Expected to complete bachelor's degree or higher	2.23	2.29
<i>Students not meeting this definition</i>	1.36	1.63
Enrolled in an academic program	2.46	2.48
<i>Students not meeting this definition</i>	2.00	2.07
Enrolled continuously in 1989–90	2.40	2.50
<i>Students not meeting this definition</i>	2.51	2.73
Enrolled anytime in academic year 1990–91	2.43	2.45
<i>Students not meeting this definition</i>	1.21	1.31
Pursuing academic major or taking courses toward bachelor's or both	3.31	3.23
<i>Students not meeting this definition</i>	1.94	2.06
Enrolled for 12 or more credit hours	3.11	3.23
<i>Students not meeting this definition</i>	1.88	2.05
Taking courses toward bachelor's	4.00	4.04
<i>Students not meeting this definition</i>	1.72	1.81
Pursuing academic major and taking courses toward bachelor's	7.39	7.18
<i>Students not meeting this definition</i>	1.99	2.07

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

**Table C4.—Estimates and standard errors for figure 4: Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions who transferred to 4-year institutions by spring 1994, the percentage who met the various definitions of potential transfer**

Potential transfer definition	Percentage of transfer students with characteristic	Standard error
Expected to complete bachelor's degree or higher	94.9	1.73
Enrolled in an academic program	88.7	2.41
Enrolled continuously in 1989–90	84.4	3.54
Enrolled anytime in academic year 1990–91	92.8	2.00
Pursuing academic major or taking courses toward bachelor's or both	68.5	3.62
Enrolled for 12 or more credit hours	55.2	4.27
Taking courses toward bachelor's	43.5	3.59
Pursuing academic major and taking courses toward bachelor's	20.5	3.12

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Table C5.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, by student characteristics and for various definitions of potential transfer

Characteristic	All students	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both			Pursuing academic major and taking courses toward bachelor's
						Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Enrolled for 12 or more credit hours	
Age									
18 or below	38.9	47.4	46.1	49.6	48.8	48.9	47.7	51.7	55.6
19 through 21	21.5	28.4	28.6	29.3	31.8	36.7	42.5	23.2	—
22 or above	7.7	15.9	15.8	13.4	16.2	30.1	—	13.5	—
Socioeconomic quartile									
Lowest quartile	10.2	21.0	27.0	20.0	18.9	29.9	—	13.2	—
Lower middle	14.2	20.9	22.1	22.3	25.7	43.4	—	27.4	—
Upper middle	27.1	35.7	33.9	38.1	37.5	34.4	35.0	38.5	—
Highest quartile	40.6	48.6	46.3	48.4	51.4	52.5	55.4	52.8	71.4
First-generation college status									
First generation	19.1	31.9	33.4	30.1	29.3	42.1	44.0	30.1	—
Not first generation	34.6	41.4	39.0	43.7	46.9	45.8	47.2	48.8	54.1
Race/ethnicity									
White, non-Hispanic	26.3	38.3	38.0	37.6	39.3	48.6	51.7	40.4	64.1
Black, non-Hispanic	15.8	15.9	—	—	—	—	—	—	—
Hispanic	24.9	34.1	29.3	34.2	32.2	—	—	—	—
Asian/Pacific Islander	—	—	—	—	—	—	—	—	—
American Indian/Alaskan Native	—	—	—	—	—	—	—	—	—
Region of institution									
Northeast	20.2	27.7	27.9	30.6	31.3	32.0	—	29.2	—
Midwest	27.1	42.8	43.3	37.3	43.1	53.2	47.7	42.3	—
South	28.6	39.7	41.0	43.2	40.8	48.2	52.2	47.0	—
West	24.7	32.7	31.2	33.3	35.2	39.6	39.4	38.9	44.7

Table C5.—Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, by student characteristics and for various definitions of potential transfer—Continued

Characteristic	All students	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both			Taking courses toward bachelor's	Pursuing academic major and taking courses toward bachelor's
						Enrolled for 12 or more credit hours	Enrolled for 12 or more credit hours	Enrolled for 12 or more credit hours		
Gender										
Male	26.1	36.3	35.0	35.3	39.3	37.0	39.3	41.0	50.3	50.3
Female	24.7	35.1	36.4	37.7	36.2	42.4	47.4	50.3	—	—

— Too few cases for a reliable estimate.

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Table C6.—Standard errors for table C5: Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, by student characteristics and for various definitions of potential transfer

Characteristic	All students	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both		Pursuing academic major and taking courses toward bachelor's	
						Enrolled for 12 or more credit hours	Taking courses toward bachelor's	Enrolled for 12 or more credit hours	Taking courses toward bachelor's
Age									
18 or below	3.02	3.35	3.74	3.39	3.49	4.24	5.19	3.87	9.37
19 through 21	3.24	4.03	4.36	4.72	5.04	6.03	7.37	5.05	—
22 or above	2.15	4.37	4.65	3.68	4.20	9.08	—	7.08	—
Socioeconomic quartile									
Lowest quartile	2.44	4.85	6.21	4.89	4.57	7.85	—	5.09	—
Lower middle	2.84	4.35	4.29	4.58	4.74	8.26	—	8.38	—
Upper middle	2.95	4.00	4.10	4.11	3.98	5.07	6.54	5.47	—
Highest quartile	3.50	4.08	3.90	4.29	4.10	4.98	5.86	4.96	8.24
First-generation college status									
First generation	2.41	3.64	4.14	3.69	3.73	5.02	6.24	5.41	—
Not first generation	2.79	3.43	3.53	3.48	3.55	4.54	5.27	4.29	8.83
Race/ethnicity									
White, non-Hispanic	2.04	2.63	2.89	2.79	2.71	3.65	4.27	3.79	8.14
Black, non-Hispanic	4.42	5.03	—	—	—	—	—	—	—
Hispanic	5.13	6.94	6.48	7.55	5.95	—	—	—	—
Asian/Pacific Islander	—	—	—	—	—	—	—	—	—
American Indian/Alaskan Native	—	—	—	—	—	—	—	—	—
Region of institution									
Northeast	3.82	4.74	5.21	6.55	5.13	6.25	—	5.29	—
Midwest	4.61	5.49	5.83	5.05	5.54	6.83	7.42	8.13	—
South	3.63	4.60	4.87	4.66	4.70	7.71	9.41	5.28	—
West	3.53	4.45	4.94	4.77	5.08	5.32	7.10	6.90	10.65



Table C6.—Standard errors for table C5: Among 1989–90 beginning postsecondary students enrolled at public 2-year institutions, percentage who transferred to 4-year institutions by spring 1994, by student characteristics and for various definitions of potential transfer—Continued

Characteristic	All students	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or			Pursuing academic major and taking courses toward bachelor's
						taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's	
Gender									
Male	2.69	3.32	3.79	3.84	3.80	4.41	4.47	5.51	9.71
Female	2.27	3.01	3.19	3.13	2.90	4.49	4.24	6.11	—

— Too few cases for a reliable estimate.

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Table C7.—Percentage of 1989–90 beginning postsecondary students enrolled at public 2-year institutions meeting each definition of potential transfer, by whether they met less restrictive definitions

Potential transfer definition	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's
Enrolled in an academic program	81.7						
Enrolled continuously in 1989–90	78.6	70.8					
Enrolled anytime in academic year 1990–91	76.3	73.2	73.4				
Pursuing academic major or taking courses toward bachelor's or both	89.1	88.5	75.7	81.7			
Enrolled for 12 or more credit hours	80.4	73.7	82.5	75.0	52.2		
Taking courses toward bachelor's	94.3	91.3	69.0	78.9	100.0	45.1	
Pursuing academic major and taking courses toward bachelor's	98.1	93.8	84.7	87.9	100.0	51.9	100.0

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment). Table reads: Among public 2-year students who indicated that they were enrolled in an academic program, 81.7 percent indicated that they expected to earn a bachelor's degree or higher.

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

Table C8.—Standard errors for table C7: Percentage of 1989–90 beginning postsecondary students enrolled at public 2-year institutions meeting each definition of potential transfer, by whether they met less restrictive definitions

Potential transfer definition	Expected to complete bachelor's degree or higher	Enrolled in an academic program	Enrolled continuously in 1989–90	Enrolled anytime in academic year 1990–91	Pursuing academic major or		
					taking courses toward bachelor's or both	Enrolled for 12 or more credit hours	Taking courses toward bachelor's
Enrolled in an academic program	2.12						
Enrolled continuously in 1989–90	2.24	2.46					
Enrolled anytime in academic year 1990–91	2.17	2.52	3.01				
Pursuing academic major or taking courses toward bachelor's or both	2.31	2.33	3.8	2.45			
Enrolled for 12 or more credit hours	2.76	3.00	2.55	3.10	3.37		
Taking courses toward bachelor's	1.87	3.06	5.20	3.37	0.00	4.41	
Pursuing academic major and taking courses toward bachelor's	1.85	3.09	5.77	4.30	0.01	6.79	0.01

NOTE: Unless otherwise specified, variables are as of 1989–90 (base year interview, first term of postsecondary enrollment).

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989–90 Beginning Postsecondary Students Longitudinal Study (BPS:1990/1994), Data Analysis System.

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