2005 AIR/NPEC RESEARCH GRANT
FINAL REPORT

How Complex Postsecondary Educational Transitions Shape Student Success

June 30, 2006

Principal Investigator

Sara Goldrick-Rab
Assistant Professor of Educational Policy Studies and Sociology
Faculty Affiliate, WISCAPE and IRP
Department of Educational Policy Studies
University of Wisconsin-Madison
210 Education Building
1000 Bascom Mall
Madison, WI 53706
Phone: 608/262-6564
Fax: 608/262-9074
E-mail: srab@education.wisc.edu

Authorized Institutional Representative

Diane Barrett
Assistant Director, Pre-Award Services
Research and Sponsored Programs
750 University Ave.
Madison, WI 53706-1490
Phone: 608/262-0252
Fax: 608/262-5111
E-mail: preaward@rsp.wisc.edu

This final report includes:

1. A final paper based on the project's findings (pp. 3-34)
2. A list of current and pending publications based on the project's findings (p. 35)
3. Information on the individuals supported under the grant (p.36)

A financial report on expenditures will be mailed under separate cover.

Getting Off Track:
Path-Dependence and Socioeconomic Inequality in College Completion

Sara Goldrick-Rab

Assistant Professor of Educational Policy Studies and Sociology

University of Wisconsin-Madison

srab@education.wisc.edu

Paper presented at the Annual Meetings of the Association for Institutional Research

May 2006

This research was funded by grants from the AIR/NPEC Grants Program on Student Success and the American Educational Research Association. The author wishes to thank Fabian Pfeffer for his extremely conscientious work in constructing the data file and estimating the models.

Introduction

One of the most unique features of the contemporary American higher education system is its broadly differentiated approach to service delivery. Today's students face a wide array of choices with regard to when, where, and for how long they access college and construct their course-taking. For example, they can choose to begin school and then take time off, perhaps re-enrolling at a later time in a different school or for fewer credits. Or, they may choose begin accumulating college credits while in high school, in order to accelerate their movement through the university. As a result, the normative transition from high school to college is now only one of many college-related transitions students make, and as a result postsecondary education can no longer be accurately viewed as a discrete choice between enrollment and non-enrollment, or schooling and nonschooling. Following the initial entry to the first college they attend, students must pass through a series of transitions in order to achieve success in the form of a bachelor's degree. Among students seeking a bachelor's degree, these transitions often occur at the end of each academic year, when their progress (or lack of progress) towards a degree is assessed. At those critical junctures, students must decide whether to persist (remain enrolled) at the same school at which they began, move to a different school, or leave school altogether. Unfortunately, extant research tells us little about the relative importance of each of those decisions, especially with regard to how the decision made at each transition affects the next transition. In other words, it is unclear how each student decision affects subsequent decisions, and whether, in fact, student success is "path-dependent."

Another important feature of the American system is a significant class gap in achievement. Among 1992 high school seniors, 62 percent of those from the top 20 percent of the socioeconomic distribution finished a bachelor's degree by age 26 or 27, compared to barely 17 percent of those from families in bottom 20 percent (Adelman, Daniel, Berkovitz, & Owings, 2003). Previous research has found that the heterogeneity in college pathways described above is related to this observable inequality in outcomes (Goldrick-Rab 20066). Poor students are more apt to move among institutions and experience enrollment interruptions, rather than remain in the same college until completion. Wealthy students, although somewhat less likely to change schools, tend to maintain enrollment continuity when they do make a move. Moreover, attending multiple institutions, particularly with interruptions, seems to lowers students' chances for degree completion (Goldrick-Rab, n.d).

But knowing that student attendance patterns vary by social class does not tell us how those differences occur and what they represent. Are attendance patterns merely 'patterns' or are they indicative of an accumulation of events, one leading into another? Does that cumulative process happen differently in the lives of poor students and rich kids? This study addresses these dual concerns about the nature of path-dependence in higher education and its potential stratifying effects by examining the significance of decisions at specific transition points for promoting degree completion, and assessing any interactions between a student's socioeconomic background and the impacts of those decisions.

Changing Postsecondary Pathways and College Completion

Students who follow the traditional route to a bachelor's degree are now in the minority—by one estimate, comprising only one fourth of the undergraduate population (Choy, 2002).[1] Today, over 50 percent of undergraduates who begin at a four-year college attend more than one institution within five years, and 15 percent attend more than two (McCormick, 2003). National studies also reveal that 25 percent to 30 percent of undergraduates take some time off from college and subsequently return, a pattern known as stopout (Berkner, 2002; Carroll, 1989). There is also some evidence that multi-institutional attendance and discontinuous enrollment intersect in student attendance patterns. One study of first-time freshmen who began their postsecondary education in 1995–1996 found that among those students who transferred institutions at least once before 2001–2002, 30 percent also stopped out of school for a period of time (Berkner, 2002). In other words, they began college at one school, took time off, and returned to another school.

These new forms of attendance are evidence that the American higher education system provides a great deal of choice and opportunity to its students and thus might be considered an open one. At the same time, the choices students make greatly structure their eventual outcomes. For example, students who begin at a two-year college are significantly less likely to finish a bachelor's degree than students who begin at a four-year institution (Brint & Karabel, 1989; Dougherty, 1994). Students who transfer to a new institution are less likely than students who remain at their first institution to complete a degree in a timely fashion (Adelman 1999). Adelman's (1999) "tool box"

[1] Choy (2002) defines the traditional route as enrolling in a 4-year college immediately after high school, attending that institution continuously and full-time, and completing a degree in 4 years.

study of degree completion found that the number of institutions attended had a negative impact on a student's chances for completion if the student did not return to the first school attended. The odds of receiving a bachelor's degree were reduced by nearly half if a student attended multiple institutions (leaving the first school attended and not returning). This effect was notably more evident among students with the same levels of college performance. A discontinuity in enrollment may also derail a student's plans for a degree. Cabrera, Burkum, and LaNasa (2003) found that students who engaged in continuous enrollment while in college were 23 percent more likely to complete a bachelor's degree. Continuity of enrollment was a particularly strong predictor of degree completion among lower SES students: students in the second lowest SES quartile increased their chances for completion by 38 percent, and students in the lowest quartile increased their chances by 27 percent, if they maintained continuous enrollment.

Postsecondary pathways differ in their outcomes in part because of constraints imposed by state and federal policies, such as those governing transfer, articulation, and financial aid. It is essential to recognize these qualitative differences in postsecondary pathways when examining educational transitions and to assess the probability of engaging in one of several options rather than focus simply on yes/no questions of enrollment (Lucas, 2001). As student movement into, out of, and among institutions increases, it is likely that where a student attends college, when, and for how long will be increasingly significant for educational outcomes (Eckland, 1964; Hearn, 1992). Variation in these facets of postsecondary pathways may contribute to some of the observed differences in completion rates, particularly those between social classes.

The Student-Choice Framework

In contrast to prior research on postsecondary attendance patterns, which has usually examined those patterns as complete pathways, viewing them in their entirety, this study employs a *student-choice* perspective (St. John et al. 1996). This perspective recognizes that students do not set out to follow a particular trajectory, but rather make specific choices throughout college that result in an accumulation of transitions that together make up a trajectory. Each of those choices may be affected by prior choices and constrained by resources and prior educational experiences. Thus, this analysis estimates whether higher education trajectories are "path-dependent"—in other words, "the degree to which transition probabilities from one level and/or type of education to another may be influenced by the particular educational pathway by which students arrived at the point of choice" (Breen & Jonsson, 2000, p. 755).

Nearly all colleges and universities require students to take a certain number of courses and earn credits towards a degree, and thus credit thresholds represent significant transition points in the postsecondary trajectory of degree-seeking students. Students who fail to cross a certain credit threshold (i.e., 30, 60, 90, and 120 credits) are unable to earn a degree, and those who do not accumulate credits in a timely fashion are unlikely to receive a degree "on time." Prior research has found that those who do not move continuously from one credit threshold to the next (in other words, who take time off during college) are more likely to depart college without a degree, implying that the process is indeed path-dependent (McCormick, 1999). This leads to the first hypothesis: that each higher education transition depends in part on the occurrence of prior transitions. For example, a student who takes time off from college after accumulating

30 credits and then returns to college at a different institution is less likely to eventually accumulate 90 credits than a student who earns 60 credits all at one institution. In this scenario, students' chances for success are influenced by their prior educational decisions.

The student-choice construct was designed to account for a sequence of choices in diverse pathways influencing educational achievement. As outlined by St. John (1996), the essential principles of the construct are the following: a) Students follow a sequence of educational choices; b) There are diverse educational patterns of choice, given that students from different backgrounds confront different choice sets; and c) The choices students make are contexualized and affected by student achievement, beliefs, and financial standing. Thus, the second hypothesis tested in this study is that pathways will vary in their effects on degree completion by a student's social class background.

Methodology

The data for this study come from the last three waves of the National Education Longitudinal Study of 1988 (NELS:88). NELS is a longitudinal education study of a national probability sample of 25,000 students first surveyed as eighth graders in 1988 and interviewed again during four follow-ups. The fifth and final wave occurred in 2000, when students were 26 or 27 years old; at that time, 12,144 individuals were interviewed, and requests for the postsecondary transcripts of the 9,602 students who had attended college were submitted to the relevant institutions. These requests yielded 15,562 transcripts for 8,889 students. Thus, students were followed for 8 years after high school graduation, which provides a substantial window within which to measure degree completion.

The sample comes from the NELS 2000 wave and includes only those students who a) Participated in the second (1992), third (1994), and fourth (2000) follow-ups;[2] b) Attended at least one postsecondary institution; and c) Had a complete transcript record (N = 8,285).[3] The college transcript data are essential to this study, since they provide a detailed and verifiable accounting of credit accumulation and grade point average, as well as interruptions in schooling and switches in institutional enrollment. As a further restriction, the sample includes only those students who initiated their studies at a four-year institution (N = 4,628). The meaning of postsecondary transitions differs significantly by institutional context: for example, a change in schools may be positive for a two-year student moving to a four-year school while negative for a four-year student moving to a two-year school. Similarly, part-time enrollment may be the norm and acceptable in a two-year institution, but non-normative and unacceptable in a four-year institution.

Given that the majority of students enrolling in four-year institutions do so with the intention of earning a bachelor's degree (CITE), the outcome of interest in this analysis is whether or not a student completed a bachelor's degree by the year 2000, when most students in the sample were 27 or 28 years old. This is a dichotomous dependent variable, and thus logistic regression was employed. We lowered the credit threshold for graduation, in order to allow for the few students who earned less than 120

[2] The sample will not be further limited to students who participated in the first survey since information from the eighth-grade year is not central to this study's questions.

[3] Restricting the sample in this way seems appropriate given that attempting to impute for the dependent variables in this analysis would be unadvisable. Limiting the sample to students with complete records will mean excluding 14 percent of cases. Students will be excluded if they enrolled in only GED or basic skills programs or took only a single course or less than five credits. The number of institutions attended is highly correlated with having a complete transcript record, thus all means and regressions presented will be weighted. Patterning by socioeconomic status has not been found among the excluded cases in prior analyses utilizing similar restrictions (Goldrick-Rab, 2006).

credits to be counted as having completed a degree, given that the transcript indicated a degree was granted.

The exogenous predictors in the model include a vector of background characteristics of the individual student—categorical measures of parents' education, occupation, and household income, and dichotomous measures for race (1=white, 0=nonwhite) and gender (1=male, 0=female). For parental occupation, the NELS categories were transformed into EGP class categories (CITE) and then aggregated into two groups: service class (0) and working class (1). The service class includes service workers and the self-employed. The working class includes skilled and unskilled manual workers, non-manual workers, and farmers. For parental education, the continuous measure was aggregated into two categories distinguishing between parents with and without a college degree. Household income is from 1991 and includes all sources of income; it is coded into three categories (under $35K, $35-75K, and >$75K).

A vector of measures of high school achievement was also included: the high school NELS achievement test score, the high school grade point average (in quintiles) and a measure of the quality of the high school curriculum (intensity, in quintiles, see Adelman 1999 for more). College achievement was measured via grade point average, which varies over time in this model.[4] In the logistic regression, college GPA was entered as dummy variables, indicating the effect of having an above the median GPA compared to a below the median GPA. Finally, a vector of postsecondary pathways related to each specific transition was included; these were designed to account for the

[4] Year by year college GPA is not included in the NELS file and thus had to be constructed in the following way: 1) Create grcr: grades x credits (weighted grades); 2) Create grcrX: Sum of grcr for study year X; 3) Create crX: Sum of credits for study year X; 4) Create gpaX: Divide grcrsumX by crsumX.

role of timely entry into college (coded as no delay if the student entered college within 8 months of high school graduation), continuity of enrollment (capturing any gaps in enrollments between transition points), and multi-institutional attendance[5] in promoting transitions.

Transition years are years of actual enrollment, which were constructed for purposes of this analysis.[6] In the model employed, each transition occurs within the boundaries of an academic year which starts July 1 and ends June 30 (following the NELS coding of academic years, designed to generalize across myriad college and university terms nationwide). This method does not count the time periods when students are absent from school following initial enrollment, except to note that indeed they were out when noting whether a stopout occurred. For example, if student A was enrolled in the academic year 1992/1993 and then again only in 1995/1996, the latter was her second year of study (and not 4th), and thus she is said to have had a stopout between transitions one and two. The majority of students in the sample started their academic years in the fall term. However, for those students who did not, we followed two rules: a) for students who began between December and May we assigned them to that academic year, since a late start in the academic year is in many ways a substantive disadvantage (e.g. a student starting in January 1993 was assigned to academic year 1992-1993); and b) students who

[5] The construction of the data file to assess instiutional movement was particularly complex. In order to count institutions we checked academic transcripts in all months of a given academic year (July 01 to June 30), and recorded all institution codes within that period (including special terms). This captures multiple enrollments within one academic year. In order to assess movement, we applied the following definition: no change occurred if a student was enrolled in school A in year T and still enrolled in school A in year T+1. Admitedly A could be one of several instituions attended during year T and moreover, changes occurring within a given academic year are missing using this method. We hope to resolve this problem in the future.

[6] A very low bar for enrollmnt was set—no credit thresholds greater than one were employed, thus a student enrolled for even one credit was considered to be in school. Thus, estimates of a penalty associated with periods of nonenrollment are likely under-, rather than over-estimates.

started school during the summer were assigned to start during the following academic year (e.g. a student starting in June 1993 was assigned to academic year 1993-1994). Notably, we excluded students who did not enroll in college by the end of 1994, so as to include only those students who had the opportunity within the window of observation to complete all four transitions. Even with this caveat, some students who have 'stopped out' will be classified as having 'departed' at the end of the time period, if they did not return during the window of observation. This is a common problem in studies of college completion, and could only be resolved via the use of survival analysis which could compensate for this right-censoring concern.

In this analysis, then, students are said to have "completed" a transition if they exceeded the appropriate credit threshold (30, 60, 90, or 120) at the end of a given year.[7] They are said to have "persisted" if they were under that credit threshold but enrolled in school during the next academic year. Finally, they "departed" if they were under the credit threshold and did not enroll in the subsequent year.[8]

Even in this restricted dataset there was a fair amount of missing data. For example, nearly one-third of all cases (29.3%) lacked a high school GPA, and for any given college transition between 2.5 and 3.2% of cases lacked a college GPA. Multiple imputation was used to compensate for missing data on achievement measures but not measures of social class. We utilized the STATA program known as 'ice,' which runs the analysis on multiple complete datasets and then automatically averages the coefficients

[7] A significant number of students earned college credits prior to college entry (as indicated by the NELS variable 'refdate'). Those credit are included in the number 'earned' during the first year of college, as in substantive meaning they act to confer advantage on certain students and not others. In other words, we seek to capture the 'leg up' students have who earned college credits prior to high school graduation.

[8] At this point, these credit thresholds are only employed for descriptive purposes (see figures 1-3) and are not yet integrated into the multivariate analysis.

and standard errors (according to Rubin's rule).[9] Measures of social class were not imputed because such an imputation would yield highly unreliable results.

STATA was also utilized for its capacity to estimate models with data from a complex survey design that included weighting, clustering, and stratification. STATA's "survey" commands adjust the standard errors to correct for both weighting and design effects.

Examining Postsecondary Transitions

The students in this sample exhibit a great deal of heterogeneity in their postsecondary transitions. As Figure 1 illustrates, students who start college at a four-year institution begin to differentiate by the end of their freshmen year, not simply into those who remain enrolled and those who do not, but also into those who make progress towards a degree and those who donot. Specifically, by transition one, 57.5 percent of students in this sample had completed 30 or more credits and were still enrolled in college. Only 5.9 percent had departed school, not enrolling in a second year. The remaining 36.6 percent of students were still enrolled, but had not obtained 30 credits by the end of year one. Whether or not students had successfully transitioned from year one to two matters for whether they successfully transitioned from years two to three: 83 percent of students who 'completed' year one went on to complete year two; 70 percent of students who only 'persisted' in year one only persisted in year two; and 74 percent of students who had left school after year one remained out of school after year two. Further, success grew even more dependent on prior success as the students moved

[9] The latter claim is, as of this draft, intentional, rather than completed. At this time, we have only run our models on one completed data set (instead of e.g. 5), and thus it is possible our standard errors at this time are too small. The rules for averaging standard errors with survey data are not yet clear. We next intend to run the analyses on 5 or more completed data sets with and without the survey command for comparison.

through college: the proportion of students successfully completing a subsequent year after successfully completing a prior year grew from 83 to 87 to 91 to 95 percent. Students who did not complete a given year were increasingly unlikely to graduate by the end of the fourth transition, and departers did not improve their chances for returning.

<<<Figure 1 about here>>>

But these transitions through college varied significantly according to whether the student had a college-educated parent. As a comparison of Figures 2 and 3 illustrates, first-generation students were significantly less likely than students with a college-educated parent to complete their first transition (47.1% vs. 67.8%), instead having a higher likelihood of either persisting or departing. As they progressed through college, these students were more likely in any given year to depart, even if they had a successful completion in a prior year (for example, among students who successfully completed transition two, 5 percent of first-generation students and 1 percent of other students departed by their third transition). Further, success did not beget success in the same way for these students; yet failure (departure) did appear to beget departure. Ninety-one percent of first-generation students who departed school prior to their third transition point remained out of school by their fourth transition point, compared to 79 percent of students with at least one college-educated parent. Put another way, students with college-educated parents appear more likely to return to school following a departure. The accumulation of these differences appears to contribute to the significant 22 point gap in college completion based on parental education.[10]

<<<Figure 2 about here>>>

[10] This is an untested hypothesis at this point. The bachelor's degree completion rates in Figures 2 and 3 are lower than the rate presented in Figure 1. This is due to the presence of missing data: figures 2 and 3 are unpooled by parental education, and thus cases with missing data on that measure are excluded.

<<<Figure 3 about here>>>

Who Are These Students?

There are many characteristics of the students in this sample which might shed light on these postsecondary transitions as well as the observable class differences. Table 1 displays the descriptive statistics for the full sample, as well as a comparison of the students with and without college-educated parent(s).

<<<Table 1 about here>>>

NELS students who began their postsecondary transitions at four-year colleges and universities were a fairly advantaged group. On average, their parents are solidly middle-class—fifty percent are college-educated, fifty percent earn more than $50,000 a year, and 45 percent of fathers are in service-class occupations. However, students whose parent(s) did not attend college are significantly more likely to be female, non-white, and come from households earning less than $35,000. Overwhelming, the fathers and mothers of first-generation college students are in working-class jobs.

On average, these students were well-prepared for college (with a B average GPA and rigorous high school curricula), but levels of high school preparation varied significantly by parental education. First-generation students in this sample were more likely to have received a GED instead of a high school diploma, to have scored 10 points lower on the NELS test, and to have had less rigorous high school curricula. As these students moved into college, their first year grade point average differed significantly as well: first-generation students averaged a 2.28, compared to 2.54 for non-first generation students. On average, the GPA of all students increased incrementally throughout each college transition (rising from 2.4 to 2.8), but at each stage first-generation students had lower GPAs.

This lower academic performance of first-generation students may be related to differences in the paths they took through college. Six percent of them delayed college entry, compared to only 3 percent of other students. They were also more likely to stopout between the years of college—the highest occurrence of stopout occurred between years 2 and 3; at that time 6.7 percent of first-generation students departed from school, compared to 3.3% of other students. Furthermore, first generation students were significantly more likely to change institutions between their first and second years of college (13.9% vs. 9.7%). Overall, the incidence of institutional change declined during later transitions—but it is notable that between their 3rd and 4th transition points, 7 percent of students changed schools.

Path-Dependence in the Transition to Completion

While the descriptive path statistics (figures 1-3) suggest that postsecondary transitions shape students' chances for degree completion, the relationships they depict might be attributable to other differences between students. For example, students who do not complete their first transition may differ in important ways from students who do not. Students who change schools may have higher levels of high school preparation from those who do not, and this may account entirely for the appearance of an effect on completion. In order to assess whether in fact the path students take during college affects their chances for degree completion *net* of their levels of high school preparation and their achievement while in college, stepwise multivariate models were estimated. An interaction term for parental education by measures of path-dependence was included in order to examine any differential impacts.[11]

[11] Interactions between household income and the path-descriptive variables were also tested in separate models; however these interactions were non-significant and did not improve the model fit.

As Table 2 indicates, the path students take through college exert a substantial and significant influence on a student's odds of degree completion. A stopout between any two transitions is associated with a larger negative change in completion than the size of the positive change associated with having strong high school achievement or preparation. A student who stops out between transitions three and four has odds of completion that are only 6 percent of those of students who do not stop out during that time. And, these models reveal that net of later stopouts in college, there is **no significant penalty** associated with delaying entrance into college. In other words, the negative impact of delaying college on chances of completion (noted in previous research such as Bozick and DeLuca n.d.) appears to be attributable to the interrupted pathway those same students follow subsequent to college entry.

Furthermore, while changing schools between transitions has a smaller effect than stopout, that negative effect is comparable in size to the positive effect of having a strong high school GPA or engaging in a rigorous curriculum. In other words, a student who changes schools between transitions may entirely negate any advantage s/he had from being well-prepared in high school.

Most notably, these pathway effects are independent of one another; in other words, the negative effect of changing schools between transitions two and three is net of the negative effect of changing schools between transitions one and two. They are also net of numerous other pathway factors controlled for in the models, including demographic characteristics, high school preparation, and college grade point average.

<<<Table 2 about here>>>

Disparities in degree completion by parental education are persistent. The advantage that students with college-educated parents enjoy over first-generation students is substantial; however, it is partly explained by differences in how students attend college, and their college grade point average. First-generation students are more likely than non-first generation students to stopout and/or to change schools between transitions, and they earn lower grades—this explains 47 percent of the observed difference in completion based on parental education.[12] In addition, we observe a significant interaction between parental education and the impact of stopping between transitions 1 and 2 and changing schools between transitions 2 and 3, such that students of college-educated parents incur a much smaller penalty on degree completion if they stop out or change schools during those times. In other words, such students enjoy at least two advantages—first, they are less likely either stop out or change institutions; and second, when they do, the negative impact on completion is significantly smaller than it is for first-generation students.

Other ascriptive characteristics also shape students' chances for a degree. White students are more likely than non-white students in this sample to complete degrees, and students with parental incomes greater than $50,000 are more likely to finish compared to students with lower household incomes. However, facets of student pathways do not interact in significant ways with either race or income.

Getting Off Track?

This paper posed the provocative question—is there inequality in how students transition through college towards a degree? In short, these tentative findings indicate

[12] Calculations are based on changes in the unstandarized coefficients, not shown.

that yes, first-generation college students are at a significant disadvantage during college. They are less likely to complete any given transition point, and this appears to be partly related to their greater propensity to stopout from college between transitions or change institutions. Moreover, the penalty for taking those divergent pathways is greater for first-generation students than for their college-educated counterparts.

The extent to which the pathway to a degree is quite literally "path-dependent" means that once a student goes 'off-track' they have great difficulty in making timely progress towards a degree. Each additional stopout or institutional change exerts an additional negative effect. This finding might be interpreted by policymakers and practitioners in two different ways. On the one hand, we could act to better enable all students to avoid interruptions in their postsecondary schooling and work to retain them at a single institution. Improving financial aid policy and enhancing counseling efforts might work in that way. Such efforts would necessarily be continuous and consistent throughout college, since a later interruption is more deleterious than an earlier one. Or, we could instead change policies and practices in such a way as to substantially diminish the penalties associated with interruptions and/or institutional changes. In other words, we could accept that some of these choices may not be unintentional diversions, and support the choices of students with fewer options. In either case, parental education should lose its impact on degree completion.

References

Adelman, C. (1999). *Answers in the tool box: academic intensity, attendance patterns, and bachelor's degree attainment*.Washington, DC: U.S. Dept. of Education.

Adelman, C., Daniel, B., Berkovitz, I., & Owings, J. (2003). *Postsecondary Attainment, Attendance, Curriculum, and Performance*.Washington DC: NCES.

Archer, Kellie J. and Stanley Lemeshow. 2006. "Goodness-of-fit test for a logistic regression model fitted using survey sample data." *The STATA Journal*. 6(1): 97-105.

Berkner, L. (2002). *Descriptive Summary of 1995-1996 Beginning Postsecondary Students: Six Years Later.*Washington DC: NCES.

Breen, R., & Jonsson, J. O. (2000). Analyzing Educational Careers: A Multinomial Transition Model. *American Sociological Review, 65*(5), 754-772.

Brint, S., & Karabel, J. (1989). *The diverted dream: community colleges and the promise of educational opportunity in America, 1900-1985*.New York: Oxford University Press.

Cabrera, A. F., Burkum, K., & La Nasa, S. M. (2003). *Pathways to a Four-Year Degree: Determinants of Degree Completion among Socioeconomically Disadvantaged Students.* Paper presented at the Association for the Study of Higher Education, Portland, OR.

Carroll, C. D. (1989). *College Persistence and Degree Attainment for 1980 High School Graduates: Hazards for Transfers, Stopouts and Part-Timers*.Washington DC: NCES.

Choy, S. P. (2002). *Nontraditional Undergraduates: A Special Analysis.*Washington DC: NCES.

Dougherty, K. J. (1994). *The contradictory college: the conflicting origins, impacts, and futures of the community college*.Albany: State University of New York Press.

Eckland, B. (1964). Social Class and College Graduation: Some Misconceptions Corrected. *American Journal of Sociology, 70*, 36-50.

Goldrick-Rab, Sara. 2006. "Following Their Every Move: How Social Class Shapes Postsecondary Pathways." *Sociology of Education*. January, v79n1. pp. 61-79.

Goldrick-Rab, Sara. No Date. "Pushed Into Jumping: The Context of "Choice" in College Pathways." Working Paper, University of Wisconsin-Madison. Madison, WI.

Grodsky, E. (2002). *Constrained opportunity and student choice in American higher education.* Unpublished Doctoral dissertation, University of Wisconsin-Madison, Madison, WI.

Hearn, J. C. (1992). Emerging Variations in Postsecondary Attendance Patterns: An Investigation of Part-Time, Delayed, and Nondegree Enrollment. *Research in Higher Education, 33*(6), 657-687.

Lucas, S. R. (2001). Effectively Maintained Inequality: Education Transitions, Track Mobility, and Social Background Effects. *American Journal of Sociology, 106*(6), 1642-1690.

Manski, C. F., & Wise, D. A. (1983). *College Choice in America*.Cambridge, MA: Harvard University Press.

Mare, R. D. (1980). Social Background and School Continuation Decisions. *Journal of the American Statistical Association, 75*, 295-305.

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

McCormick, A. C. (2003). Swirling and Double-Dipping: New Patterns of Student Attendance and Their Implications for Higher Education. In J. King (Ed.), *New Directions for Higher Education* (Vol. 121, pp. 13-24).

McDonough, P. M. (1997). *Choosing colleges: how social class and schools structure opportunity*.Albany: State University of New York Press.

Rab, S. (2004). *Swirling Students: Putting a New Spin on College Attrition.* Unpublished Doctoral Dissertation, University of Pennsylvania, Philadelphia, PA.

Raftery, A., & Hout, M. (1993). Maximally Maintained Inequality: Expansion, Reform, and Opportunity in Irish Education, 1921-75. *Sociology of Education, 66*(1), 41-62.

Rosenbaum, J. (2001). *Beyond College for All: Career Paths for the Forgotten Half*.NYC, NY: Russell Sage Foundation.

Schneider, B., & Stevenson, D. (1999). *The Ambitious Generation: America's Teenagers, Motivated but Directionless*.Connecticut.

Shavit, Y., & Blossfeld, H.-P. (1993). *Persistent Inequality: Changing Educational Attainment in Thirteen Countries*.Boulder, CO: Westview Press.

St. John, E. P., & et al. (1996). The Nexus Between College Choice and Persistence. *Research in Higher Education, 37*(2), 175-220.

Wagner, A. (2001). From Higher to Tertiary Education, *International Higher Education Newsletter* (Vol. 22). Boston, MA: Boston College Center for International Higher Education.

Walpole, M. (2003). Socioeconomic Status and College: How SES Affects College Experiences and Outcomes. *Review of Higher Education, 27*(1), 45-73.

FIGURE 1. POSTSECONDARY TRANSITIONS (FULL SAMPLE)

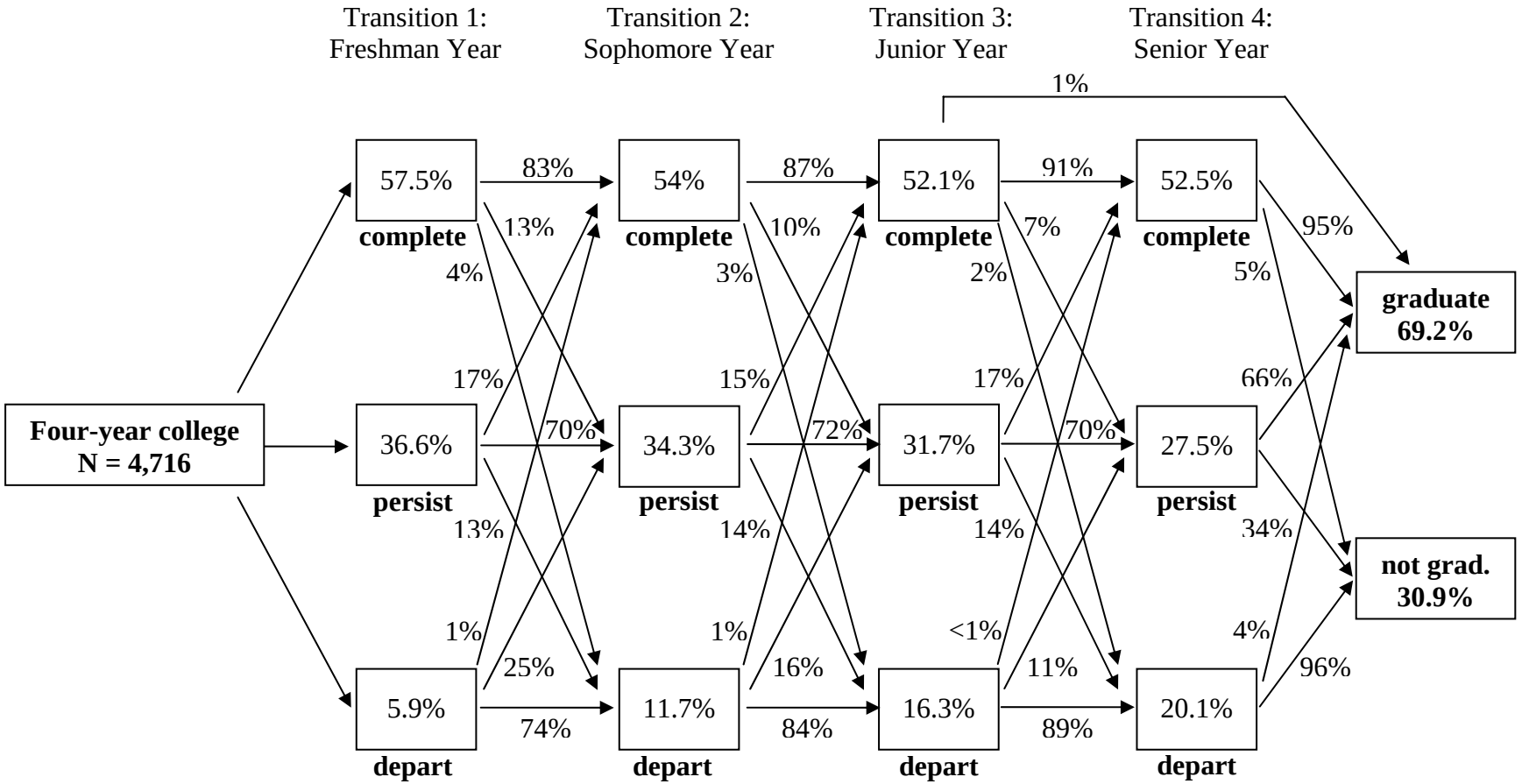
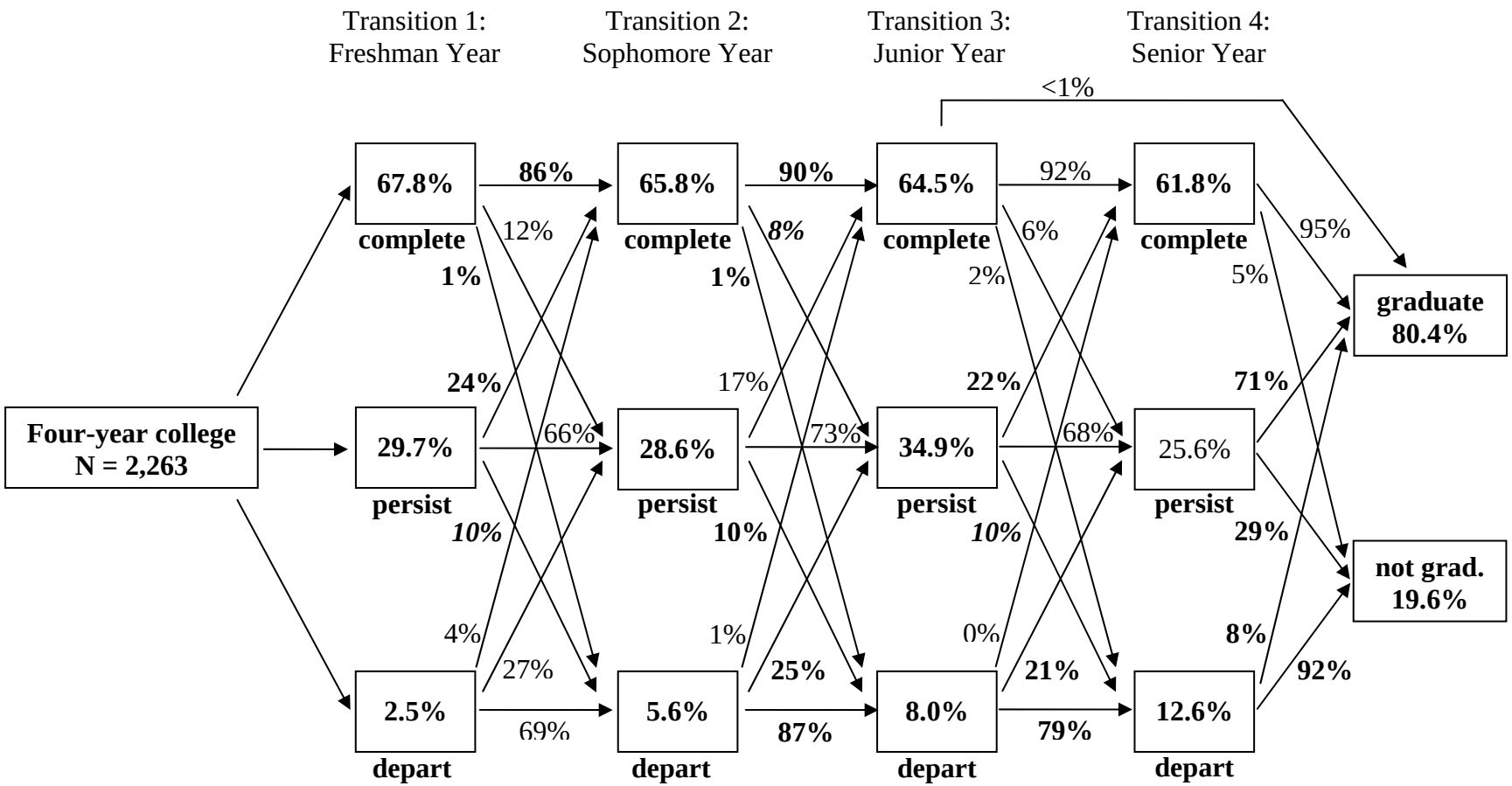
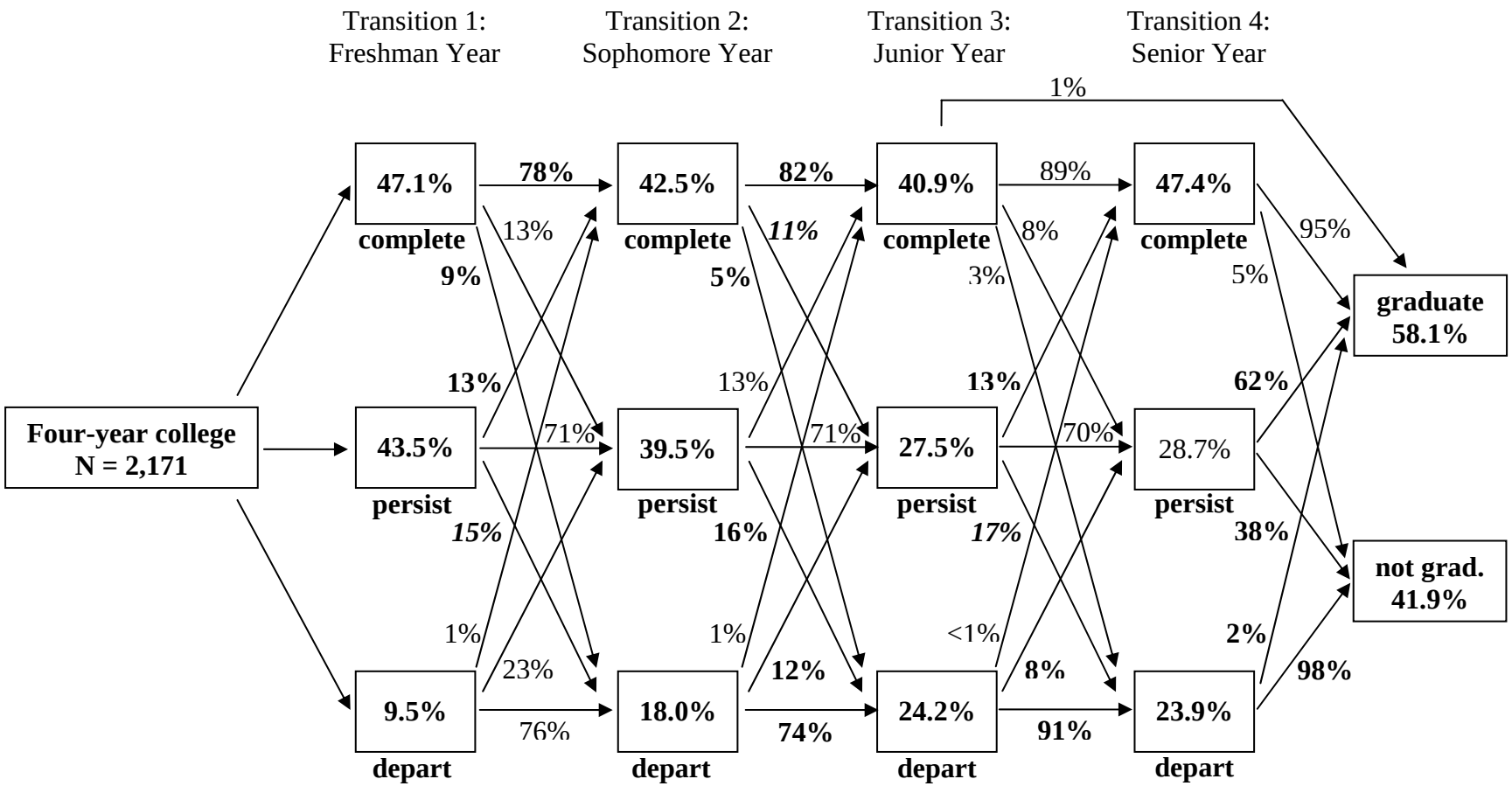


FIGURE 2. POSTSECONDARY TRANSITIONS (STUDENTS WITH COLLEGE-EDUCATED PARENTS)



Numbers in bold indicate significant class differences at p<.05; in bold and italic at p<.10

FIGURE 3. POSTSECONDARY TRANSITIONS (FIRST-GENERATION STUDENTS)



Numbers in bold indicate significant class differences at p<.05; in bold and italic at p<.10

Table 1. Descriptive Statistics									
	Total			Parent(s) with BA			Parent(s) without BA		
	N [a)] (% imp.)	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE
Dependent variable									
Transition Year 1	4716			2263			2171		
Complete		57.5			*67.8*			*47.1*	
Persist		36.6			*29.7*			*43.5*	
Depart		5.9			*2.5*			*9.5*	
Transition Year 2	4716			2263			2171		
Complete		54.0			*65.8*			*42.5*	
Persist		34.3			*28.6*			*39.5*	
Depart		11.7			*5.6*			*18.0*	
Transition Year 3	4716			2263			2171		
Complete		51.5			*64.0*			*40.1*	
Persist		31.7			*27.5*			*34.9*	
Depart		16.3			*8.0*			*24.2*	
Complete & Graduate		0.6			0.5			0.8	
Transition Year 4	4698			2249			2167		
Complete		52.5			*65.4*			*40.4*	
Persist		27.5			*24.2*			*30.0*	
Depart		20.1			*10.4*			*29.5*	

Table 1 Cont. Descriptive Statistics									
	Total			Parent(s) with BA			Parent(s) without BA		
	N [a)] (% imp.)	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE
Demographics									
Sex	4716			2263			2171		
Male		46.1			*48.9*			*43.6*	
Female		53.9			*51.1*			*56.4*	
Race	4716			2263			2171		
White		77.5			*84.3*			*71.0*	
Non white		22.5			*15.7*			*29.0*	
Social background									
Parental education	4434								
Less than HS		3.7							
HS graduate		10.8							
Some college		35.1							
BA		24.7							
Masters		17.0							
Ph.D. / 1st prof. degree		8.7							
Household income	4127			2089			2033		
<15k		8.3			*1.8*			*14.6*	
15k - <25k		10.2			*3.9*			*16.8*	
25k - <35k		10.5			*6.8*			*14.5*	
35k - <50k		20.5			*14.6*			*26.3*	
50k - <75k		26.2			*31.9*			*20.9*	
75k +		24.2			*41.0*			*6.9*	

Table 1 Cont. Descriptive Statistics									
	Total			Parent(s) with BA			Parent(s) without BA		
	N [a)] (% imp.)	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE
HH income (3 categ.)	4127			2089			2033		
< 35k		29.1			*13.5*			*45.9*	
35k - <75k		46.8			46.5			47.2	
75k +		24.2			*41.0*			*6.9*	
SES Composite	4700	.406	.022	2259	*.925*	*.017*	2164	*-.114*	*.024*
Father's Class	4242			2101			1896		
I/II Service class		39.2			*.59*			*.18*	
III Routine non-manual		16.0			17.0			14.7	
IVa/b: Self-employed		5.8			5.0			6.4	
V Skilled manual		28.0			*12.8*			*44.6*	
VI Unskilled manual		8.7			*4.7*			*13.2*	
VII Farmers		2.3			*1.8*			*3.0*	
Father's Class (2 categ.)	4242			2101			1896		
Service class		45.0			*63.8*			*24.5*	
Working class		55.0			*36.2*			*75.5*	
Mother's Class	4442			2150			2029		
I/II Service class		26.3			*41.1*			*11.8*	
III Routine non-manual		28.9			*35.3*			*20.9*	
IVa/b: Self-employed		2.2			21.9			22.3	
V Skilled manual		8.1			*5.7*			*10.1*	
VI Unskilled manual		16.3			*11.8*			*21.6*	
VII Farmers		0.2			.2			.3	
Homemaker		18.0			18.2			18.6	

Table 1 Cont. Descriptive Statistics									
	Total			Parent(s) with BA			Parent(s) without BA		
	N [a)] (% imp.)	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE
Mother's Class (2 categ)	4442			2150			2029		
Service class		28.5			*43.3*			*14.0*	
Working class		53.5			*38.5*			*67.3*	
Homemaker		18.0			18.2			18.6	
Achievement									
GED	4716	0.9		2263	*0.5*		2171	*1.4*	
HS GPA	4716 (29.3%)	3.127	.016	2263	*3.235*	*.020*	2717	*3.036*	*.023*
NELS HS test	4716 (7.3%)	69.832	.623	2263	*75.004*	*.716*	2171	*65.239*	*.905*
HS Academic Curriculum	4715 (11.3%)			2263			2171		
Highest Quintile		40.5			*46.0*			*35.2*	
Second Quintile		29.4			30.1			29.3	
Third Quintile		15.3			*12.4*			*17.8*	
Fourth Quintile		10.7			*8.9*			*12.4*	
Lowest Quintile		4.2			*2.6*			*5.3*	
GPA year 1	4716 (2.8%)	2.406	.021	2263	*2.537*	*.025*	2171	*2.277*	*.033*
GPA year 2	4568 (2.9%)	2.568	.022	2236	*2.703*	*.028*	2059	*2.448*	*.032*
GPA year 3	4374 (3.2%)	2.691	.019	2196	*2.800*	*.021*	1924	*2.585*	*.032*
GPA year 4	4154 (2.6%)	2.778	.019	2137	*2.861*	*.025*	1775	*2.661*	*.031*

Table 1 Cont. Descriptive Statistics									
	Total			Parent(s) with BA			Parent(s) without BA		
	N [a)] (% imp.)	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE	N	Percentage or Mean	Linearized SE
Path-descriptive variables									
Delay HS - year 1	4716	5.1		2263	*3.0*	2171	*6.2*		
Delay year 1 - year 2	4568	3.5		2263	*2.5*	2059	*4.6*		
Delay year 2 - year 3	4374	4.9		2196	*3.3*	1924	*6.7*		
Delay year 3 - year 4	4154	4.3		2137	3.6	1773	4.8		
Inst. change year 1 - year 2	4568	11.9		2236	*9.7*	2059	*13.9*		
Inst. change year 2 - year 3	4374	9.9		2196	9.3	1924	10.1		
Inst. change year 3 - year 4	4154	7.1		2137	5.8	1775	7.1		

Table 2. Logistic Regression of Bachelor's Degree Completion
Odds ratios presented

	I		II		III		IV	
Male	.76	**	.74	*	.95		.94	
	(.09)		(.12)		(.15)		(.15)	
White	1.43	**	1.80	***	1.49	**	1.50	**
	(.23)		(.30)		(.26)		(.26)	
NELS test	1.002		1.004		.998		.998	
	(.003)		(.003)		(.003)		(.003)	
HS GPA quintile 2	1.31	*	1.39	*	1.23		1.24	
	(.21)		(.25)		(.24)		(.25)	
HS GPA quintile 3	2.48	***	1.97	***	1.43	*	1.47	*
	(.43)		(.39)		(.30)		(.31)	
HS GPA quintile 4	3.47	***	3.85	***	2.23	***	2.25	***
	(.64)		(.91)		(.61)		(.62)	
HS GPA quintile 5 (highest)	5.65	***	4.32	***	1.55		1.53	
	(1.81)		(1.96)		(.76)		(.74)	
HS Acc.curr. quintile 2	1.54		1.39		1.93		1.90	
	(.48)		(.50)		(.81)		(.78)	
HS Acc.curr. quintile 3	2.16	**	1.93	*	3.10	**	3.01	***
	(.66)		(.75)		(1.37)		(1.29)	
HS Acc.curr. quintile 4	3.59	***	2.80	***	4.32	***	4.21	***
	(1.10)		(1.04)		(1.88)		(1.80)	
HS Acc.curr. quintile 5 (highest)	3.86	***	2.13	**	3.29	***	3.18	***
	(1.18)		(.77)		(.1.36)		(1.29)	
Delay HS - year1	.45	**	.80		.86		.89	
	(.16)		(.26)		(.37)		(.39)	
Parent with BA	1.74	***	1.41	**	1.34	*	1.14	
	(.23)		(.23)		(.23)		(.22)	
HH income >=$50k	1.61	***	1.72	***	1.85	***	1.88	***
	(.20)		(.27)		(.29)		(.29)	
Professional class	.996		.94		.98		.97	
	(.13)		(.16)		(.17)		(.17)	
Delay year1 - year2			.19	***	.11	***	.06	***
			(.07)		(.05)		(.03)	
Delay year2 - year3			.18	***	.13	***	.19	***
			(.05)		(.04)		(.08)	
Delay year3 - year4			.07	***	.06	***	.09	***
			(.02)		(.02)		(.04)	

Table 2. Logistic Regression of Bachelor's Degree Completion (cont)
Odds ratios presented

	I		II		III		IV	
Inst.change year1 - year2			.57	***	.53	***	.51	**
			(.11)		(.11)		(.15)	
Inst.change year2 - year3			.44	***	.43	***	.27	***
			(.09)		(.09)		(.09)	
Inst.change year3 - year4			.50	***	.55	**	.40	***
			(.11)		(.13)		(.14)	
GPA year1 above median					2.47	***	2.46	***
					(.40)		(.40)	
GPA year2 above median					2.75	***	2.79	***
					(.53)		(.54)	
GPA year3 above median					1.54	**	1.58	**
					(.28)		(.29)	
GPA year4 above median					2.40	***	2.40	***
					(.40)		(.40)	
Par.edu * delay year1-2							4.68	*
							(4.11)	
Par.edu * delay year2-3							.52	
							(.29)	
Par.edu * delay year3-4							.42	
							(27)	
Par.edu * change year1-2							1.05	
							(.47)	
Par.edu * change year2-3							2.51	**
							(1.12)	
Par.edu * change year3-4							2.15	
							(1.07)	
N	3,719		3,301		3,301		3,301	
F-adjusted test statistic	1.818	*	.710		.573		1.834	*
p-value	.061		.700		.820		.059	
[a)] Adjusted Pseudo R^2	.165		.225		.323		.324	
[a)] Log Pseudo-Likelihood	-1,860		-1,227		-1,067		-1,058	

* p<=.1, ** p<=.05, *** p<=.01
[a)] These fit statistics are reported for heuristic purposes only. As they are not available for regression models for complex survey data, they have been derived from standard logistic regression models accounting for weighting but ignoring sample clustering and stratification.

Current and Pending Publications

Sara Goldrick-Rab. "Getting Off Track: Path Dependence and Socioeconomic Inequality in College Completion."

- Paper presented at the 2006 Annual Meetings of the Association for Institutional Research. Chicago, IL.

- Paper to be submitted for publication in *Review of Higher Education* by August 2007.

Sara Goldrick-Rab. "Does How You Go Matter? The Effect of Attendance Patterns on Degree Completion."

- Paper to be submitted for presentation at the 2007 Annual Meetings of the American Educational Research Association, Chicago, IL.

- Paper to be submitted for publication in *Journal of Higher Education* by mid-summer 2007.

Demographic Characteristics of Individuals Supported by Grant

Principal Investigator: Female, Caucasian, U.S. Citizen, No Disability

Research Assistant: Male, Caucasian, German Citizen, No Disability