

Published in final edited form as:

J Higher Educ. 2013 January 1; 84(1): 1–26. doi:10.1353/jhe.2013.0007.

Delayed enrollment and College Plans: is There a Postponement Penalty?

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Abstract

Using a representative longitudinal survey of Texas high school seniors who graduated in 2002, we investigate how college postponement is associated with four-year college expectations and attendance—focusing both on the length of delay and the pathway to the postsecondary system. Like prior studies, we show that family background and student academic achievement explains the negative association between delay and college expectations and that these factors, along with two-year college entry pathway, largely accounted for the negative association between postponement and enrollment at a four-year institution in 2006. Although delays of one year or longer are associated with significantly lower odds of attending a baccalaureate-granting institution four years after high school, the longest delays do not incur the most severe enrollment penalties.

Most students who aspire to a postsecondary degree enroll in college the fall semester following their graduation from high school; however, growing numbers of college-bound high school graduates are choosing to delay college enrollment. Horn, Cataldi, and Sikora (2005) reported that nearly one-third of 1995–1996 college freshmen delayed their college entry, but in the 1999–2000 school year, about 46 percent of *all* undergraduates experienced a hiatus between their high school completion and postsecondary enrollment (Barton, 2002). Nevertheless, relatively few studies examine the correlates and consequences of delayed enrollment; their general consensus is that six to eight years after high school graduation, degree attainment is substantially lower for students who delayed college entry compared with on-time enrollees (Carroll, 1989; Hearn, 1992; Bozick & DeLuca, 2005; Rowan-Kenyon, 2007).

Delayed enrollment need not undermine pursuit of baccalaureate degrees if the hiatus from academic work allows students to mature, to acquire work experience, and to accumulate resources for college. Postponement can be problematic, however, if the hiatus is long, if postponement increases the likelihood of beginning college in a two-year rather than a baccalaureate-granting institution, and if time away from academic activities lowers college expectations—all circumstances that are associated with failure to receive a bachelor's degree. Existing studies use inconsistent measures to represent delay, but they concur about the socio-demographic and academic profile of students who postpone college entry. Only

two studies have considered how the length of postponement influences students' enrollment at a four-year postsecondary institution (Bozick & DeLuca, 2005; Rowan-Kenyon, 2007), although their measurements are questionable for reasons elaborated below. Except for the tendency for delayed enrollees to enter the postsecondary system through two-year colleges, evidence about the mechanisms through which delay influences pursuit of baccalaureate degrees is limited.

Accordingly, we exploited a rich longitudinal survey of Texas high school seniors to address two limitations of prior studies about delay, namely how educational expectations and length of postponement are associated with actualization of college plans. To broaden the external validity of our analysis, we compared Texas delay patterns with those based on national surveys. Although a four-year post-high school window precludes an analysis of degree completion, we examined two outcomes—one cognitive and one behavioral—that are highly predictive of degree attainment: college expectations and matriculation at a baccalaureate-granting institution four years after high school graduation (Messersmith & Schulenberg, 2008).

Consistent with prior studies, we found that the negative association between delayed enrollment and educational expectations is entirely due to variation in family background and student academic achievement; once these attributes are modeled statistically, the association is rendered trivial. Furthermore, these family and student attributes, along with two-year college entry pathway, largely account for the negative association between postponement and enrollment at a baccalaureate-granting institution four years after high school graduation. The relationship between the length of delay and students' college attendance is not linear, however, which we speculate is related to unobserved attributes that measure students' determination to actualize their college plans.

Background

Early studies of college decision-making acknowledged the sequential character of the process and its grounding in postsecondary aspirations (Fuller, Manski, & Wise, 1982; Behrman, Kletzer, McPherson, & Schapiro, 1998). Hossler, Smith, and Vesper (1999) proposed three general stages to represent the sequential decisions leading to college enrollment: (1) the predisposition to attend college, (2) the search for a choice set, and (3) matriculation. During the search stage, students test their aspirations against options based on their calculated probability of admission (Fuller et al., 1982; Manski & Wise, 1983) and adjust application behavior accordingly. Submission of applications concludes the search process, but the onset and evolution of the predisposition stage is less clearly defined because expectations continue to evolve as students reconcile aspirations and predispositions with actual experiences (Kao & Tienda, 1998; DesJardins, Dundar, & Hendel, 1999; Messersmith & Schulenberg, 2008) and because some students delay their initial enrollment in a postsecondary institution for academic, financial, and other personal reasons. If time spent away from school erodes college expectations, then pursuit of a college degree will be lower for delayers compared with on-time enrollees of comparable achievements.

Of the studies that have evaluated the correlates of college delay, Hearn (1992) confirmed that students with high educational aspirations were less likely to delay college enrollment and to attend part-time. His aspirations measure is based on a question that asked respondents to indicate the lowest level of education with which they would be satisfied, which Hearn claimed is preferable to the more conventional measures that portray students' "unbounded idealism." It is difficult to interpret his results substantively because the ordinal measure of aspirations is modeled as an interval scale. Hearn claimed that similar findings can be obtained for educational expectations, but these are not reported (see fn. 9 in Hearn,

1992).¹ Neither Rowan-Kenyon (2007) nor Bozick and DeLuca (2005) examined the association between college expectations and delay, either to establish whether college plans change or mediate enrollment behavior. Their decision may have been due to endogeneity biases, particularly if measures of changes in expectations are not available.

Postsecondary expectations link the first and third stages of the college decision process described by Hossler and associates (1999) and, as such, are important to consider when evaluating the consequences of postponement. Although aspirations and expectations are often used interchangeably, there is ample evidence that they are conceptually different (Kao & Tienda, 1998). The advantage of expectations over aspirations measures is that they include assessments of how difficult as well as how realistic the stated educational goal is. Expectations, unlike aspirations, represent “plans in action” (Messersmith and Schulenberg, 2008). For example, students who report that they expect a college degree tend to pursue a college curriculum, to take college entrance exams, and to excel in high school.

Educational expectations not only are strong predictors of postsecondary enrollment but also are relatively stable over time; nevertheless, college plans can and do change. Messersmith and Schulenberg (2008) showed, for example, that low-income students—and particularly those from lone-parent families, from minority backgrounds, and who reside in rural areas—often fall short of realizing their expectations. However, they did not examine the timing of enrollment as a mechanism through which youth become derailed from their expected pathway nor did they consider whether the type of institution initially attended lowered students’ college attainments relative to their reported expectations.² Whether postsecondary expectations remain stable among students who delay college enrollment, however, is an empirical question that has not yet been addressed.

Three key studies that examined the prevalence of college delay and its evolution over time are based on nationally representative samples of high school seniors and largely corroborate several key findings.³ For the high school class of 1972 (NLS-72), Eckland and Henderson (1981) showed that compared with students who do not postpone college enrollment, delayed enrollees disproportionately hail from lower socioeconomic backgrounds, have lower academic credentials, and are more likely to enter the postsecondary system at two-year institutions. For the 1980 senior class, Hearn (1992) showed that delayed enrollment is associated with socioeconomic constraints and academic marginality. Bozick and DeLuca’s (2005) analysis of college-going behavior for the 1992 senior class revealed that delay is more prevalent in the south and that students who postpone enrollment are less likely to attend four-year institutions compared with on-time enrollees. Owing to formidable changes in both the volume and the composition of high school graduates since 1992, Rowan-Kenyon (2007) concluded her analysis of delay with a call for analyses using more recent data.⁴

Despite agreement about two core determinants of delayed enrollment, namely family socioeconomic status and college readiness, existing studies differ in the window of time used to assess postponement behavior and the criteria used to define delay. In particular,

¹Hearn’s inability to interpret the substantive implications of the point estimates was due to scaling constraints imposed by the NCES data. In addition to discussing the limitations of the indicators he uses, Hearn offers to provide results from auxiliary analyses and invites researchers to verify his claims.

²They did examine students’ aspirations to attend a two-year college, but aspirations are much weaker predictions of actual behavior than expectations (Kao & Tienda, 1998).

³Bozick and Deluca provide an excellent review of studies that use a variety of samples to investigate the correlates of delay, showing that the majority support findings from national studies.

⁴The ELS tracks the 2004 cohort of high school seniors, but the most recent wave of data collection was obtained in 2006, just two years after high school graduation. Rowan-Kenyon has argued (and we agree) that this period is too short for evaluating postponement behavior. The next ELS follow-up, planned for 2012, will likely not be available until 2014.

there is very limited evidence about how the likelihood of enrollment in a baccalaureate-granting institution changes with the length of postponement. Eckland and Henderson (1981) classified students who enrolled in the same year they graduated from high school as on-time enrollees; students who postponed college by one semester were designated delayed enrollees. Hearn (1992) considered students who began college within one year of high school graduation as on-time enrollees, but Bozick and DeLuca (2005) classified students who matriculated within seven months of high school graduation as on-time enrollees. Horn, Cataldi, and Sikora (2005) classified students who matriculated one semester after high school graduation as on-time enrollees. Using data for a 1995–1996 cohort of college freshmen, they examined the correlates of the length of delay, which in their study ranged from 1 year to 10 or more years. Despite the longer observation window, Horn and associates' assessment of the length of delay conflated period and cohort differences in college enrollment behavior because their analysis was based on a sample of enrolled college freshmen that included multiple cohorts of high school senior cohorts.

Bozick and DeLuca's (2005) study, which measured postponement in months, used the highest level of measurement precision, but assumed a linear association between delay and eventual enrollment. This assumption may overstate the association between length of delay and college attendance for two reasons. First, degree-seeking students cannot enroll in a college in any month; rather, enrollment occurs on the basis of semesters or quarters, which requires categorical measurement. Second, there is reason to believe that a semester delay is qualitatively different from a hiatus that lasts a full year or longer. Single semester postponement allows students to attend classes with members of their high school cohort, but longer delays do not. Furthermore, students who delay two or more years may differ in systematic ways from those who postpone enrollment for a single year. On the one hand, students who prolong delay are at higher risk of experiencing life course events, such as marriage and childbirth, which lower the likelihood of enrolling at a four-year institution. On the other hand, these delayers may be highly motivated to succeed and thus differ from typical delayers in attributes not measured by observable characteristics that are related to college attendance. That is, their postponement may reflect practical considerations, such as the need to accumulate savings in order to attend a four-year institution.

Using a recent high school senior cohort from Texas, we expand on prior research by examining how the length of college postponement is associated with postsecondary expectations and attendance at a baccalaureate-granting institution four years post-high school graduation. Stated as questions, we ask: First, how is the length of postponement associated with college expectations? Second, is the timing of college enrollment consequential for the likelihood of enrollment at a baccalaureate-granting institution during the observation window? Finally, to what extent are the observed differences in four-year college enrollment among delayed versus on-time enrollees due to systematic variation in family background, academic achievement, and the two-versus four-year pathway to the postsecondary system?

Our data are based on a high school cohort for a single state rather than a national survey; therefore we address external validity of our findings by documenting a high similarity in the incidence of delay between the Texas senior cohort analyzed and several nationally representative cohort studies. An advantage of focusing on a single state is that there is less variation in tuition costs across states, which Kane (1996) has argued is a crucial determinant of the two- and four-year initial enrollment options across states. Two-year institutions have grown rapidly in Texas, and since the mid-1990s, the statewide share of postsecondary enrollment engaged in two-year colleges has surpassed that of four-year institutions (Tienda & Sullivan, 2009). This development can potentially influence students'

pursuit of baccalaureate degrees by increasing the number of students that begin their postsecondary training at community colleges and thus incur transfer hurdles.

Data and Analytical Strategy

The empirical analyses used the longitudinal survey data collected under the auspices of the Texas Higher Education Opportunity Project (THEOP). In spring 2002, a representative sample of Texas public high school seniors was surveyed (Wave 1); a random subsample of the senior cohort was re-interviewed the following spring (Wave 2) and again four years after high school graduation (Wave 3). The baseline survey obtained basic demographic, socioeconomic, and standard tracking information as well as information about high school performance, experience, and college plans. The first follow-up survey (Wave 2) recorded whether respondents actually enrolled in college one year after high school graduation and, if so, when and where. Wave 3 interviews solicited information about students' educational pursuits and college attainment.

Using a two-stage stratified sampling design, 13,803 seniors were interviewed using a paper and pencil in-class survey instrument in the baseline. For cost reasons, a random subsample of 8,345 seniors was selected for follow-up surveys.⁵ The response rate for Wave 2 interviews was 70 percent, generating 5,836 completed surveys. With weights, the Wave 2 sample represents the baseline population.

Due to the difficulty in locating respondents, Wave 3 field interviews lasted over a year, from January 2006 to March 2007; 12 percent (485 out of 4,114) of Wave 3 respondents were interviewed after August 2006—four years after respondents' high school graduation. The Wave 3 response rate of 50 percent yielded 4,114 cases; Wave 3 sample weights were developed to adjust the sample to the original population. Although the 50 percent response rate for Wave 3 survey raises questions about the representativeness of the sample, comparisons between the 8,345 random subsample of the baseline and the 4,114 Wave 3 respondents show a high degree of similarity based on ethno-racial composition and post-high school intentions.⁶

Delayed Enrollment Status

College enrollment status was ascertained in both the second and third wave interviews. We used IPEDS codes to determine and append institutional characteristics, including types of degrees offered (e.g., technical/vocational, associate, or baccalaureate). Texas 2002 high school graduates who matriculated at a postsecondary institution before the end of 2002 were designated as on-time enrollees; those who had not enrolled in any postsecondary institution by 2006–2007, four years after high school graduation, were designated as non-enrollees. All other enrollees were classified as delayed enrollees. Based on the timing of enrollment, we classified students into one of five enrollment status categories:

- On-time (enrolled by December, 2002),
- One-semester delay (enrolled January 2003—May 2003),
- One-year delay (enrolled June 2003—December 2003),

⁵To guarantee the maximum possible precision for blacks and Asians, all baseline respondents from these groups were included in the longitudinal samples; proportionate samples of Hispanics and non-Hispanic whites were randomly drawn for the sample balance.

⁶Tables comparing respondent attributes across waves are in the methods reports. The sampling scheme for the baseline is described in detail in the "Methodology Report," http://theop.princeton.edu/surveys/baseline/baseline_methods_pu.pdf. For Wave 2 surveys, the sampling scheme is described in "Senior Wave 2 Survey Methodology Report," http://theop.princeton.edu/surveys/senior_w2/senior_w2_methods_pu.pdf. Finally, the Wave 3 sampling scheme is described in "Senior Wave 3 Survey Methodology Report," http://theop.princeton.edu/surveys/senior_w3/senior_w3_methods_pu.pdf.

- Two-year delay (enrolled in 2004), or
- Three/four-year delay (enrolled in 2005 or 2006).

College Expectations and Four-Year College Attendance

Because the duration of the longitudinal survey spanned only four years, it was not possible to examine college completion rates, which are generally assessed after six years. In fact, there is evidence that the length of time to college degrees has increased (Adelman, 2004; Wirt et al., 2004). Therefore, we analyzed two correlates of college degree attainment that are influenced by the timing of postsecondary enrollment, namely (1) college expectations at Wave 3 and (2) enrollment status at a baccalaureate-granting institution four years post-high school graduation (at Wave 3).

Students were asked about their college plans in all three waves. The baseline survey queried students about their postsecondary expectations by asking: “Realistically speaking, how far do you *think* you will go in school?”⁷ One year after high school graduation, when students were re-interviewed at Wave 2, they were asked, “What is the highest level of education you ever *expect* to complete?” These items are comparable to those used in national surveys to distinguish between aspirations and expectations (Kao & Tienda, 1998). In the Wave 3 survey, which occurred four years after students graduated from high school, respondents were asked, “What is the highest level of education you think you will have completed *at age 30*?” From these questions, we constructed three indicator variables to measure college expectations at each point in time. Specifically, respondents who indicated they expected a baccalaureate degree or higher at each interview were coded 1 and other responses were coded 0.⁸

We constructed two college attendance variables: enrollment at a baccalaureate-granting institution four years after high school graduation (1 = yes; 0 = otherwise) and type of postsecondary institution initially attended (two-year, vocational/technical, or four-year institution). Enrollment status at Wave 3 is the second outcome variable of interest, and initial enrollment status measures college entry pathway.⁹ The appendix table summarizes the operational definitions of all measures analyzed.

Descriptive Results¹⁰

Table 1 reports college enrollment outcomes of the Texas high school senior class of 2002 and compares their enrollment distribution with that of three national studies based on cohorts of high school seniors for the last three decades of the 20th century. These studies use different periods and metrics to measure delay, yet there is a clear trend toward greater participation in the postsecondary education system. Just over half of the 1972 senior class enrolled in college four years after high school (Eckland & Henderson, 1981), and over 80 percent of the 1992 high school class had enrolled in a postsecondary institution eight years after high school graduation (Bozick & DeLuca, 2005). A decade later, 80 percent of the

⁷Students were also asked about their aspirations at baseline, but both for consistency in measurement across waves and because expectations are reality-checked versions of aspirations, we restrict our analysis to expectations.

⁸Data on education expectations at age 30 were not available for the 469 respondents whose interviews were conducted by a proxy respondent in Wave 3, but we did not find that proxy status was correlated with individual characteristics and SES status. Proxy respondents could answer factual questions, such as enrollment status, but not attitudinal questions.

⁹Only a handful of observations lacked information about the type of institution initially attended; we omitted these cases from descriptive analyses and constructed flags to represent these cases in multivariate analyses.

¹⁰We applied Wave 2 weights for descriptive analyses based on Wave 1 and Wave 2 college expectations in order to take advantage of the larger sample size. Descriptive results are virtually identical whether Wave 2 or Wave 3 weights are used. These results are available upon request. We applied Wave 3 weights for descriptive and multivariate analyses on college expectations and attendance based on the 2006 interview.

Texas high school class of 2002 had enrolled in a postsecondary institution within four years of receiving their high school diplomas, and nearly two-thirds did so without delay.

Given differences in the definition of on-time enrollment and the time metric to observe enrollment behavior, it is difficult to draw firm inferences about changes in the prevalence of delay based on the national studies. Nevertheless, the comparisons provide assurance that the behavior of the Texas high school senior cohort is reasonably similar to that of the most recent national cohort of students.

Using a rather conservative measure of delay over an eight-year observation period, Bozick and DeLuca (2005) showed that 16 percent of the 1992 senior class postponed their college enrollment *more than* one semester. With a four-year observation window, we show that 14 percent of Texas high school graduates delayed postsecondary enrollment *at least* one semester. These estimates are remarkably consistent given the differences in observation windows, which reflects the declining probability of enrollment over longer durations. For the Texas cohort, we also present the distribution of delay by duration, which shows that half of the students classified as delayed enrollees postponed college by only one semester (which Bozick & Deluca designated “on-time”); the rest delayed enrollment between one and three-four years (the maximum time observed in the survey).

Table 2 presents college expectations and enrollment status according to delay status for the Texas high school class of 2002. Compared with on-time enrollees, lower shares of students who delayed enrollment reported that they expected to complete at least a bachelor’s degree during their senior year of high school—57 versus 80 percent, respectively. That expectations rose for both groups the following year likely reflects students’ realignment of their plans with a reassessment of realistic possibilities. The rise in college expectations was particularly pronounced for students who postponed enrollment, among whom four in five reported that they expected to complete a college degree. Even after goal realignment, eight percent more on-time enrollees expected to complete a bachelor’s degree or higher compared with delayers.

Once crystallized, educational expectations tend to remain stable (Messersmith & Schulenberg, 2008), although differentials between on-time and delayed enrollees persist. Moreover, postsecondary expectations differ according to the length of postponement but not in a monotonic way. Over 80 percent of students who postpone college enrollment either one semester or over three years reported that they expected a college degree, compared with only 76 to 78 percent of students who postponed one or two years, respectively. This pattern implies a nonlinear association between delay and expectations, but the small differences likely reflect systematic variations in characteristics that are associated with college plans, which we investigate below.

Although crystallized educational expectations are reliable predictors of actual enrollment, postponement thwarts the prospect of enrollment at a baccalaureate-granting institution. About 65 percent of on-time enrollees were enrolled at a four-year institution in 2006 compared with only 23 percent of students who delayed their college plans. Furthermore, students’ enrollment status at a baccalaureate-granting institution differs according to the length of postponement, but not in a monotonic fashion. Approximately one-third of students who delayed their college plans by one semester or one year were enrolled at baccalaureate-granting institution in 2006 compared with only 10 percent of students who postponed two or more years. It appears that one year is a key postponement threshold such that students that delay longer are substantially less likely to pursue their baccalaureate degree ambitions.

Prior national studies have found that delayed enrollees are more likely than on-time enrollees to start their college career at community colleges (Eckland & Henderson, 1981; Bozick & DeLuca, 2005), which is consequential for the prospects of completing a four-year degree because large numbers of students who enter the postsecondary system at two-year institutions do not successfully transfer to a baccalaureate-granting institution (Brint & Karabel, 1989; Grubb, 1991; Dougherty, 1994). As shown in Table 3, compared to on-time enrollees, higher shares of Texas students who delay college plans begin their careers at two-year institutions. Nearly two-thirds of on-time enrollees entered the postsecondary system at a four-year institution, compared with only 20 percent of students who delayed enrollment. In fact, roughly half of the students who postponed their college plans first enrolled at a community college and an additional 30 percent matriculated at a vocational or technical institution, compared with 35 and 5 percent, respectively, of on-time enrollees.

The right panel of Table 3 shows how students' pathway to the post-secondary system depends on the length of delay. Among students who postponed their college careers by one semester or by a year, between 56 and 60 percent entered through the community college system and an additional 12 to 15 percent first enrolled at a vocational or technical institution. The two-year and vocational pathways are much more prevalent among students who postpone for longer periods, however. Community colleges serve as the postsecondary gateway for 42 and 28 percent, respectively, of students who postpone enrollment by two years or by three or four years. The vocational pathway to the postsecondary education system is highest among students who deferred college plans for three or more years.

Combined, Tables 2 and 3 provide evidence that students' success in actualizing college plans depends not only on the length of delay but also how delay influences their enrollment pathway (i.e., via a two- or four-year institution) and determination to actualize college goals. Whether the nonlinear associations between delay and college plans are due to other factors that are systematically related both to the likelihood of postponement and its duration, as well as the pathway to the postsecondary system, is an empirical question that requires multivariate methods, to which we now turn.

Multivariate Analysis

Models

We estimated probit models to assess the association between postponement and both postsecondary expectations and attendance at a baccalaureate-granting institution in 2006. Formally,

$$Y = \alpha + \beta \text{Delayed} + \gamma Z + \varepsilon \quad (1)$$

$$Y = \alpha + \beta_1(\text{one semester}) + \beta_2(\text{one year}) + \beta_3(\text{two years}) + \beta_4(\text{three/four years}) + \gamma Z + \varepsilon \quad (1a)$$

wherein model 1, delay is a binary variable that indexes delayed enrollment status, and in model 1a, the length of delay is explicitly specified. Z is a vector of covariates that influence college expectations and enrollment outcomes, including student demographic characteristics (race/ethnicity); academic performance (dummy variables indicating top and second decile class rank; standardized test scores); college predisposition (dichotomous variables indicating whether respondents took college entrance exams and AP courses, when they first thought about going to college, and reporting of college expectations during high school senior year); and socioeconomic background (represented by dummy variables for parents' education and home ownership status) as well as the college orientation of the high school (indexed by the socioeconomic composition of their high schools as well as having

four or more close friends who planned to attend college). The appendix table summarizes the operational description of all covariates.

Because delayed enrollees are more likely than on-time enrollees initially to matriculate at community colleges (Eckland & Henderson, 1981; Bozick & DeLuca, 2005), we also estimated whether the institutional pathway to postsecondary schooling drives the association between length of delay and the likelihood of attending a baccalaureate-granting institution (at Wave 3). To estimate whether initial enrollment in a two-year college influences the chances of attending a degree-granting institution at the end of the observation period, we expanded model 1 by considering college entry pathway. Formally,

$$Y = \alpha + \beta \text{Delayed} + \gamma Z + \delta \text{Pathway} + \varepsilon \quad (2a)$$

$$Y = \alpha + \beta_1(\text{one semester}) + \beta_2(\text{one year}) + \beta_3(\text{two years}) + \beta_4(\text{three/four years}) + \gamma Z + \delta \text{Pathway} + \varepsilon \quad (2a)$$

wherein “pathway” is a set of dummy variables denoting the type of institution initially attended (four-year, two year, or vocational/technical).¹¹ For each specification, we estimated a baseline with no covariates and a second model that includes the full set of covariates.

Statistical Results

Table 4 reports summary statistics of the covariates used in the multivariate analysis for the sample of students who ever enrolled in a post-secondary institution during the observation window. Consistent with findings based on nationally representative samples of high school graduates, delayed enrollees from the Texas class of 2002 were weaker academically and averaged lower socioeconomic status than their classmates who enrolled immediately after high school. Higher shares of students who postponed their college plans for a semester or longer had parents with less than a high school education and exhibited weaker college dispositions than on-time enrollees. Slightly more males than females postponed enrollment by a semester or more, and Hispanics had higher rates of delay than both white and Asian students. Compared with students who delayed, higher shares of on-time enrollees graduated from an affluent high school, ranked in the top 20 percent of their high school class, completed one or more AP courses, and reported having multiple college-bound friends. Furthermore, lower shares of delayed enrollees took a college entrance exam during their senior year compared with on-time enrollees, which signals lower expectations during high school, and they averaged about 90 fewer points on the SAT.¹² Consistent with prior research, Texas students who postponed college enrollment were more disadvantaged economically and averaged lower academic achievement than on-time enrollees, but there was also considerable socioeconomic and academic differentiation among students who delayed. Consistent with the enrollment differentials by length of delay reported in Table 2, students who delayed one semester or one year were more similar to each other than either group was to students who postponed two or more years. Still, among students who delayed enrollment, those who postponed by one year were the most advantaged based on family

¹¹We also estimated a model where delayed status is allowed to interact with pathway. Because the interaction terms do not consistently achieve statistical significance, we present the additive specification.

¹²We converted ACT scores to their SAT equivalent, if available, or predicted missing SAT scores using students' decile class rank, high school curriculum, most recent math and English grades, whether they have taken English and math AP courses, whether languages other than English are spoken at home, gender, race/ethnicity, college disposition, parental education, home ownership, high school types, and several high school attributes obtained from Texas Education Agency reports, including percent enrolled in grades 11 to 12 taking AP courses, percent AP exams passed, percent students passed an algebra test, percent with college plans, and high school dropout rate.

background and academic achievement, and those who postponed by three to four years were the most disadvantaged. For example, 41 percent of one-year delayers had college-educated parents, compared with one-third of students who delayed two and three or more years. One-year delayers averaged SAT scores of 912, compared with 890 for those who postponed by one-semester. By comparison, students who delayed three to four years barely topped 850 points on the SAT examination. Among students who postponed postsecondary enrollment, those who delayed by one year also surpassed all others in their AP course taking, which is a strong predictor of college intentions.

Table 5 presents estimates for the baseline association between delayed enrollment and degree expectations four years after high school graduation using two measures of postponement. The left panel reports marginal effects on college expectations using the binary measure of delay, and the right panel disaggregates delay by duration. Compared with on-time enrollees, students who delayed were eight percentage points less likely to report that they expected to complete a bachelor's degree or higher. This difference in educational expectations is due entirely to systematic variation in family background, college orientation, and academic achievement. Consistent with claims that expectations are relatively stable once crystalized, the association between baccalaureate degree expectation at Wave 1 and Wave 3 is strong and positive; moreover, the point estimate is unaltered by the operational measurement of delay (column 2 and 2a). The baseline model for the association between educational expectations and the length of delay affirms the nonlinear association reported in Table 2. Four years after high school graduation, students who delayed postsecondary enrollment by one semester were five percentage points less likely to report that they expected to complete a bachelor's degree or higher, and those who postponed college by a year were 10 percentage points less likely to expect to do so. These differences largely reflect systematic variation in family background and academic accomplishments.

Table 6 evaluates the association between delay and attendance at a baccalaureate-granting institution and sequentially considers potentially mediating mechanisms. The left panel reports the average marginal effects of delayed enrollment on baccalaureate-granting institution attendance status in 2006. Point estimates for the baseline model indicate that seniors who postponed college enrollment by any amount were 40 percentage points less likely to be enrolled at a baccalaureate-granting institution in 2006 compared with their classmates who enrolled on time. Column 2 reports estimates from the model that includes measures of family background and students' academic achievement (estimates not shown) as well as Wave 1 college expectations. These covariates account for just over half of the delayers' lower likelihood of attending a baccalaureate-granting institution four years post-high school graduation (compare columns 1 and 2). The association partly works through college entry pathway, as the point estimate drops to 12 percentage points when entry pathway is modeled (column 4). Notably, the estimates are robust to alternative specifications of delay (columns 2 and 2a, columns 4 and 4a). High school seniors who reported college expectations were 11 to 12 percentage points more likely to attend a baccalaureate-granting institution in 2006 compared with statistically comparable classmates with lower educational expectations.

The results in columns 3 and 4 reveal that the four-year college enrollment penalties associated with delay also derive from students' postsecondary entry pathway. Nearly three-quarters of the enrollment penalty associated with delay reflects student differences in family background, academic achievement, and college entry pathway. Both because they incurred a transfer hurdle and because they differed systematically in characteristics that predict four-year college attendance, students who began their postsecondary careers in community colleges or vocational and technical schools were between 26 and 37 percentage

points less likely to be enrolled in a baccalaureate-granting institution in 2006 compared with statistically similar students who first enrolled in a four-year institution. The marginal effects associated with college pathway, which are robust across specifications that use different measures of delay (see columns 3 and 3a, 4 and 4a), are consistent with other studies that question the viability of the community colleges as a stepping-stone to college degree attainment (Dougherty, 1994; Long & Kurlaender, 2009).

The right panel of Table 6 illustrates the importance of specifying the length of postponement in order to understand the association between delay and eventual degree attainment. Compared with on-time enrollees, students who postponed college entry by one-semester were 28 percentage points less likely to attend a baccalaureate-granting institution in 2006 and those who delayed enrollment by a full year were 30 percentage points less likely to do so (column 1a). Those with longer delay incurred a much higher attendance penalty in that they were nearly 60 percentage points less likely than on-time enrollees to attend a baccalaureate-granting institution four years after high school graduation.

The negative association between postponement and baccalaureate-granting institution enrollment is largely due to variation in students' family background, prior academic achievements, and college expectations (column 2a) and initial college pathway (columns 3a and 4a). In fact, these factors fully account for the attendance penalty associated with a semester delay. That is, students who postpone enrollment by one semester are indistinguishable from statistically similar students who enroll immediately following high school graduation. This is not the case for longer delays; moreover, the net association between delay and enrollment in a baccalaureate-granting institution four years after high school is nonlinear.

It appears that students who delayed college entry for two years were most disadvantaged vis-à-vis on-time enrollees; specifically, they were 24 percentage points less likely to be enrolled in a baccalaureate-granting institution in 2006 compared with statistically similar classmates who did not experience a hiatus in their educational careers. By comparison, students who postponed college by one year or by three or four years incurred an enrollment penalty of approximately nine percentage points. However, the coefficient for delays of three or four years is imprecisely estimated due to greater heterogeneity of this group, which is evident in the large standard error. Because students who postponed college by three or four years were the most socially and academically disadvantaged among all who delayed postsecondary enrollment, family socioeconomic status and academic achievement explain a larger share of their enrollment penalties compared with other delayers (compare models 1a, 2a, and 4a).

In short, delays of one year or longer are associated with significantly lower odds of attending a four-year postsecondary institution, yet students with the longest delays do not incur the most severe enrollment penalties. We suspect that unobservable characteristics, such as motivation, determination, and maturation, may undergird these results, but our data do not permit a further investigation of these mechanisms. This is an empirical question that invites further research.

Summary and Conclusions

Despite general agreement that students who delay postsecondary enrollment are at considerable risk of not completing a college credential compared with their peers who enroll on time (Carroll, 1989), less evidence has been brought to bear on the length of delay as an important mechanism through which postponement influences baccalaureate degree attainment. The few existing studies about the correlates of delay confirm the socio-

demographic profile of students who postpone their college careers and acknowledge their higher propensity to enter the postsecondary system via two-year institutions.

Using a representative longitudinal sample of the Texas high school class of 2002, we investigated how the timing of college enrollment and the pathway to the postsecondary system is associated with students' college expectations and attendance at a baccalaureate-granting institution in 2006. Results show that the influence of delay on enrollment at a baccalaureate-granting institution four years after high school graduation depends not only on family background, prior academic achievement, and whether initial enrollment occurred at a two- or four-year institution, as other studies show, but also on the length of delay and the students' college expectations. That our estimates of the prevalence of delay for a single state are quite similar to those based on recent national studies inspires confidence in the external validity of our findings. Given the short observation period, however, our estimates of delay and its attendant consequences are likely to be conservative.

We found that compared with on-time enrollees, students who postponed college enrollment were less likely to expect a bachelor's or higher degree and much less likely to attend a postsecondary institution four years post-high school graduation. The double-whammy of delay and two-year pathway warrants further investigation to identify circumstances that are amenable to targeted policy intervention. Students who delayed enrollment for one semester incurred a modest attendance penalty that largely reflected their lower college readiness, socioeconomic status, and higher likelihood of initial enrollment at a two-year college. Enrollment delays of one year or longer were associated with a significantly lower likelihood of attending a four-year institution that is not fully explained by these factors. Yet, somewhat surprisingly, the longest delays did not incur the most severe enrollment penalties, which we speculate reflects unobserved differences such as motivation and determination.

That many students graduate from high school expecting to eventually attain a bachelor's degree warrants some attention to the circumstances that thwart their college plans. Prior studies have signaled the two-year pathway as a risk factor in that students who begin their postsecondary careers in community colleges or technical and vocational institutions experience additional barriers associated with transfer and commuting. Some of these risks can be mitigated through stronger advising at two-year institutions, particularly if such initiatives can be targeted to students who *both* want to complete a baccalaureate degree and also demonstrate the ability to succeed in a four-year academic program.

Of course, a four-year degree may not be appropriate or even beneficial to all students. The recently published "Pathways to Prosperity" report from the Harvard Graduate School of Education (Symonds, Schwartz, & Ferguson, 2011) notes that the demand for jobs requiring technical skills or less than four years of college is increasing and that many of these workers have better wage prospects than some bachelor degree holders, particularly majors in humanities, arts, and some social sciences. Over 60 percent of Texas students who delayed their postsecondary training three or four years enrolled in a vocational/technical institution, which suggests that the school hiatus may have provided them with the labor market feedback about alternative ways to improve their wage prospects short of pursuing a four-year college degree. The policy challenge, then, is to identify talented students for whom delay thwarts postsecondary plans despite their high educational expectations and results in non-enrollment from students for whom delay provides labor market feedback relevant to a vocational/technical postsecondary career.

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Appendix

| Variable Definitions | |
|--|--|
| Variable | Questionnaire Items and/or Operational Definitions |
| Outcome Variables | |
| 2006 College Expectations | “What is the highest level of education you think you will have completed <i>at age 30?</i> ” BA or higher = 1, less than BA = 0 |
| 2006 Four-Year Enrollment Status | If students were enrolled at a four-year postsecondary institution at Wave 3 = 1; Other enrollment or non-enrollment = 0 |
| Key Independent Variables | |
| On-Time Enrollment | Same calendar year of high school graduation |
| Delayed Enrollment | First postsecondary enrollment after December 2002 |
| Length of Delay | |
| One Semester | First postsecondary enrollment between January and May 2003 |
| One Year | First postsecondary enrollment between June and December 2003 |
| Two Years | First postsecondary enrollment in 2004 |
| Three/Four Years | First postsecondary enrollment in 2005/2006 |
| Senior Year Postsecondary Expectations | “Realistically speaking, how far do you think you will go in school?” |
| Initial Enrollment | BA or higher = 1; less than BA = 0 |
| Four-Year Institution | First enrollment at a four-year institution = 1 |
| Two-Year Institution | First enrollment at a two-year institution = 1 |
| Vocational/Technical Institution | First enrollment at a vocational/technical institution = 1 |
| Covariates | |
| Parental Education | Five categories: (1) Less than high school; (2) High school; (3) Some college; (4) College and higher; (5) Missing/Don’t Know. Use mother’s education level primarily and use father’s education level if mother’s is missing |
| Home Ownership | “Does your family own or rent the home you live in?” Three categories: (1) Own; (2) Rent; (3) Missing/Don’t know |
| College Orientation | “When did you first think about going to college?” Four categories: (1) Always; (2) Middle high school; (3) High school; (4) Missing/Don’t know |
| Race/Ethnicity | “What term best describes your racial and ethnic origin?” Five categories: (1) Black; (2) Hispanic; (3) Asian; (4) White; (5) Missing/Other |
| Sex | Female = 1; Male = 0 |
| High School Economic Status | Percent of High School students ever economically disadvantaged (based on receipt of free or reduced-price lunch) Three categories: (1) Affluent (lowest quartile); (2) Average (middle two quartile); (3) Poor (highest quartile) |
| Region | If high school located in South or East Texas = 1; Otherwise = 0 |
| Class Rank | Self-reported class rank. Three Categories: (1) Top decile; (2) Second decile; (3) Third decile or lower |
| Testscore Information | |
| SAT Score | SAT scores; missing test scores are replaced with converted ACT score if available or imputed using a broad set of variables |
| SAT Imputed | Yes = 1; No = 0 |

| Variable Definitions | |
|----------------------|---|
| Variable | Questionnaire Items and/or Operational Definitions |
| AP Course Taking | "Have you taken or are you currently taking any Advanced Placement (AP) course?" Yes = 1; No = 0 |
| College-Going Peers | "About how many friends that you spend time with plan to go to college?" Four or more = 1; Three or fewer = 0 |

Note. From the Texas Higher Education Opportunity Project, Senior Wave 1, 2, & 3 Data.

TABLE 1

Enrollment Delay and Measurement: A Comparison of four Studies

| Cohorts and Data | College Enrollment Distribution (Row percent) | | | By the Length of Delay | | | | Measurement | |
|--|---|-------------------|-------------------|------------------------|----------|-----------|------------------|------------------------------------|---|
| | Not Enrolled | On-Time Enrollees | Delayed Enrollees | One Semester | One Year | Two Years | Three/Four Years | Years Since High School Graduation | Window for On-Time Enrollment |
| 1972 Seniors (NLS-72) ^a [<i>n</i> = 19,015] | 49 | 41 | 10 | -- | -- | -- | -- | 4 | Same calendar year of high school graduation year |
| 1980 Seniors (HS&B) ^b [<i>n</i> = 8,203] | 37 | 52 | 10 | -- | -- | -- | -- | 2 | Within 1 year of high school graduation |
| 1992 Seniors (NELS 88) ^c [<i>n</i> = 11,366] | 17 | 67 | 16 | -- | -- | -- | -- | 8 | Within 7 months of high school graduation |
| 2002 Texas Seniors ^d [<i>n</i> = 5,836] | 20 | 66 | 14→ | 7 | 3 | 2 | 2 | 4 | Same calendar year of high school graduation year |

Note. Row percents may not add to 100 due to rounding; -- = data not available.

^aEckland and henderson, 1981, Table 1.1

^bHearn, 1992, Table 1

^cBozick and DeLuca, 2005

^dTexas Higher Education Opportunity Project, Senior Wave 1, 2, & 3 Data (THEOP); row percent excludes 38 cases, unknown enrollment.

TABLE 2
College Expectations and four year Institution Enrollment by Delay Status (in percent)

| | On-Time Enrollees | All Delayed | All Delayed by Length of Delay ^a | | | |
|--|-------------------|-------------|---|----------|-----------|------------------|
| | | | One Semester | One Year | Two Years | Three/Four-Years |
| Percent Expected College Degree | | | | | | |
| High School Senior Year (Wave 1) [n] | 80 [3,841] | 57 [781] | -- | -- | -- | -- |
| One Year After High School Graduation (Wave 2) [n] | 88 [3,841] | 80 [781] | -- | -- | -- | -- |
| Four Years After High School Graduation (Wave 3) [n] | 88 [2,611] | 79 [648] | 83 [261] | 76 [161] | 78 [104] | 82 [99] |
| Percent Ever Attended Four Year Institution | | | | | | |
| Enrolled at Wave 3 [n] | 65 [2,755] | 23 [663] | 34 [272] | 32 [165] | 11 [104] | 10 [99] |

Note. From the Texas Higher Education Opportunity Project, Senior Wave 1, 2, & 3 Data. Difference in case numbers for college expectations at Wave 3 and four year enrollment at Wave 3 is due to proxy cases. -- = not applicable.

^aFor 23 cases, month of enrollment is missing; these observations are excluded from analyses by length of delay.

TABLE 3

Initial Postsecondary Pathway by Delay Status (in percent)

| Initial Enrollment | On-Time Enrollees | All Delayed | All Delayed Length of Delay ^a | | | |
|---------------------------|-------------------|-------------|--|----------|-----------|------------------|
| | | | One Semester | One Year | Two Years | Three/Four Years |
| Four-Year-Institution | 61 | 21 | 24 | 31 | 17 | 10 |
| Two-Year-Institution | 35 | 49 | 60 | 56 | 42 | 28 |
| Vocational/Technical | 5 | 29 | 15 | 12 | 41 | 61 |
| Column total [<i>n</i>] | 100[2,755] | 100[663] | 100[272] | 100[165] | 100[104] | 100[99] |

Note. From the Texas Higher Education Opportunity Project, Senior Wave 1, 2, & 3 Data.

^aFor 23 cases, month of enrollment is missing; these observations are excluded from analyses by length of delay.

TABLE 4

Summary of Statistics for Covariates

| | All Enrollees | | All Delayed by Length of Delay | | | |
|------------------------------------|---------------|---------|--------------------------------|----------|-----------|------------------|
| | On-Time | Delayed | One Semester | One-Year | Two-Years | Three/Four Years |
| | [3,841] | [781] | [444] | [177] | [78] | [70] |
| <i>Parental Education</i> | | | | | | |
| Less Than High School | 0.12 | 0.20 | 0.19 | 0.15 | 0.22 | 0.29 |
| High School (reference) | 0.18 | 0.25 | 0.21 | 0.24 | 0.24 | 0.22 |
| Some College | 0.25 | 0.21 | 0.21 | 0.20 | 0.22 | 0.19 |
| College and Higher | 0.30 | 0.17 | 0.19 | 0.21 | 0.13 | 0.03 |
| Not known/Missing | 0.15 | 0.17 | 0.20 | 0.20 | 0.19 | 0.27 |
| <i>Home Ownership</i> | | | | | | |
| Rent | 0.12 | 0.17 | 0.16 | 0.17 | 0.21 | 0.24 |
| Own (reference) | 0.76 | 0.66 | 0.67 | 0.66 | 0.62 | 0.59 |
| Not known/Missing | 0.12 | 0.17 | 0.17 | 0.17 | 0.17 | 0.17 |
| <i>First Thought About College</i> | | | | | | |
| Always (reference) | 0.67 | 0.48 | 0.50 | 0.55 | 0.36 | 0.38 |
| Middle High School | 0.11 | 0.15 | 0.15 | 0.15 | 0.15 | 0.14 |
| High School | 0.13 | 0.20 | 0.18 | 0.15 | 0.35 | 0.29 |
| Not known/Missing | 0.09 | 0.17 | 0.17 | 0.15 | 0.14 | 0.19 |
| <i>Race/Ethnicity</i> | | | | | | |
| Black | 0.18 | 0.20 | 0.21 | 0.19 | 0.17 | 0.20 |
| Hispanic | 0.29 | 0.43 | 0.41 | 0.35 | 0.56 | 0.57 |
| Asian | 0.09 | 0.05 | 0.05 | 0.07 | 0.00 | 0.07 |
| White (reference) | 0.42 | 0.30 | 0.38 | 0.43 | 0.27 | 0.19 |
| Other/Missing | 0.02 | 0.02 | 0.02 | 0.03 | 0.00 | 0.04 |
| <i>Sex</i> | | | | | | |
| Female | 0.52 | 0.48 | 0.45 | 0.50 | 0.51 | 0.50 |
| <i>High School Economic Status</i> | | | | | | |
| Affluent | 0.29 | 0.19 | 0.20 | 0.19 | 0.19 | 0.16 |
| Average (reference) | 0.62 | 0.69 | 0.67 | 0.73 | 0.72 | 0.72 |

| | All Enrollees | | All Delayed by Length of Delay | | | |
|------------------------------------|---------------|-----------|--------------------------------|-----------|-----------|------------------|
| | On-Time | Delayed | One Semester | One Year | Two Years | Three/Four Years |
| | [3,841] | [781] | [444] | [177] | [78] | [70] |
| Poor | 0.09 | 0.12 | 0.13 | 0.08 | 0.09 | 0.13 |
| <i>Region</i> | | | | | | |
| Southeast | 0.43 | 0.47 | 0.46 | 0.47 | 0.64 | 0.41 |
| <i>Class Rank</i> | | | | | | |
| Top Decile | 0.22 | 0.07 | 0.07 | 0.12 | 0.03 | 0.03 |
| Second Decile | 0.21 | 0.13 | 0.15 | 0.14 | 0.09 | 0.07 |
| Third Decile or Lower (reference) | 0.57 | 0.80 | 0.78 | 0.74 | 0.88 | 0.90 |
| <i>Test Score Information</i> | | | | | | |
| SAT Score (S.D.) | 976 (193) | 887 (157) | 890 (165) | 912 (152) | 862 (144) | 851 (123) |
| SAT Imputed | 0.24 | 0.52 | 0.48 | 0.44 | 0.60 | 0.71 |
| <i>AP Course Taking</i> | | | | | | |
| Taken AP | 0.53 | 0.34 | 0.34 | 0.39 | 0.31 | 0.26 |
| <i>College Going Peers</i> | | | | | | |
| Four or More College Going Friends | 0.83 | 0.71 | 0.70 | 0.76 | 0.68 | 0.66 |

Note. From the Texas Higher Education Opportunity Project, Senior Wave 1, 2, & 3 Data. *n* in brackets.

TABLE 5

Marginal Effects of Delay on Bachelor Degree Expectation at Wave 3

| | (1) | (2) | (1a) | (2a) |
|------------------------------|---------------------------|----------------------------|----------------------------|----------------------------|
| All Delayed | -0.08 [*] (.042) | 0.00 (.024) | -- | -- |
| Length of Delay ^a | | | | |
| One Semester | -- | -- | -0.05 [*] (.026) | 0.02 (.020) |
| One year | -- | -- | -0.10 ^{**} (.039) | -0.03 (.041) |
| Two years | -- | -- | -0.09 (.073) | -0.02 (.032) |
| Three/four years | -- | -- | -0.06 (.082) | 0.07 (.054) |
| W1-College-Expectations | -- | 0.14 ^{***} (.020) | -- | 0.14 ^{***} (.019) |
| Covariates | No | yes | No | yes |

Note. From the Texas Higher Education Opportunity Project, Senior Wave 1, 2, & 3 Data. Covariates include race/ethnicity dummies, female, top decile dummy, second decile dummy, SAT score, SAT score imputed dummy, Taken AP dummy, have four or more friends planning to go to college in high school senior year, high school economic status dummies, southeast region dummy, parental education dummies, home ownership dummies, first thought about college dummies, college expectations in high school senior year. $n = 3259$. -- = not included.

^aFor 23 cases, month of enrollment is missing; these observations are excluded from analyses by length of delay.

[†] $p < 0.10$,

^{*} $p < 0.05$,

^{**} $p < 0.01$,

^{***} $p < 0.001$

Table 6

Marginal Effects of Delay on Four-Year College Enrollment at Wave 3

| | (1) | (2) | (3) | (4) | (1a) | (2a) | (3a) | (4a) |
|------------------------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
| All Delayed | −0.40*** (.038) | −0.17*** (.025) | −0.17*** (.027) | −0.09*** (.020) | -- | -- | -- | -- |
| Length of Delay ^a | | | | | | | | |
| One Semester | -- | -- | -- | -- | −0.28*** (.032) | −0.11*** (.023) | −0.10*** (.030) | −0.03 (.023) |
| One Year | -- | -- | -- | -- | −0.30*** (.054) | −0.13** (.047) | −0.15*** (.045) | −0.09* (.037) |
| Two Years | -- | -- | -- | -- | −0.57*** (.079) | −0.35*** (.074) | −0.33*** (.054) | −0.24*** (.041) |
| Three/Four Years | -- | -- | -- | -- | −0.58*** (.091) | −0.14** (.050) | −0.27*** (.056) | −0.09† (.047) |
| W1 College Expectations | -- | 0.17*** (.023) | -- | 0.12*** (.023) | -- | 0.17*** (.022) | -- | 0.11*** (.021) |
| Two-Year Pathway | -- | -- | −0.38*** (.013) | 0.26*** (.020) | -- | -- | −0.38*** (.015) | −0.26*** (.020) |
| Vocational Pathway | -- | -- | −0.54*** (.067) | −0.37*** (.064) | -- | -- | −0.52*** (.065) | −0.35*** (.058) |
| Covariates | No | Yes | No | Yes | No | Yes | No | Yes |

Note. From the Texas Higher Education Opportunity Project, Senior Wave 1, 2, & 3 Data. Covariates include race/ethnicity dummies, female, top decile dummy, second decile dummy, SAT score, SAT score imputed dummy, taken AP dummy, have four or more friends planning to go to college in high school senior year, high school economic status dummies, southeast region dummy, parental education dummies, home ownership dummies, first thought about college dummies, college expectations in high school senior year. $n = 3418$. --- = not included.

^aFor 23 cases, month of enrollment is missing; these observations are excluded from analyses by length of delay.

† $p < 0.10$,

* $p < 0.05$,

** $p < 0.01$,

*** $p < 0.001$