

From Diplomas To Degrees

A Longitudinal Study of the College Enrollment
and Graduation Outcomes of High School
Graduates from the School District of
Philadelphia

Prepared for:
Project U-Turn
and
The Philadelphia Youth Network

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December 2015

EXECUTIVE SUMMARY

Just one out of five graduates of the School District of Philadelphia (SDP) graduate with a college degree or certificate within seven years after they graduate high school. Below-average college enrollment rates and low levels of persistence once enrolled in college lead to a small proportion of SDP graduates earning a college degree or certificate.

This study examines the college enrollment, retention and completion outcomes of a cohort of SDP students who entered high school as ninth graders during the 2003-04 academic year and subsequently graduated from a SDP high school. Most of the earnings gains from college for young people in the Greater Philadelphia accrue at completion. Indeed, we find virtually no annual earnings advantage for young college-goers who dropped out before completing college with a degree compared to high school graduates who never enrolled in college. Consequently, this study focuses not just on college enrollment but also on college completion.

Using the multivariate logistic regression method, the study examines factors that determine the likelihood of enrolling in college, the timing of that enrollment decision, the likelihood of an SDP graduate remaining in college for the first year after initial enrollment, and the likelihood that a college-enrolled SDP graduate will earn a college diploma.

This summary presents findings of this study on the four broad groups of factors that influence college success including:

- Demographic characteristics
- High school context and student behavioral traits
- Academic proficiency
- Level, sector, and timing of college enrollment

Demographic Characteristics

- SDP sent 144 females graduates to college for every 100 college-enrolled male graduates. Part of this imbalance is the consequence of many more females than males graduating from high school. After holding other factors constant (like academic proficiency) male SDP graduates were substantially less likely than females to enroll in college. Males who did enroll in college were modestly less likely than females to earn college degree or certificate.
- Race-ethnicity is found to have an important influence on college success among SDP graduates. Regression analysis of the likelihood of college enrollment found that African American SDP graduates were substantially more likely to enroll in college than their White non-Hispanic counterparts, as were Asian graduates. But for a disproportionate

share of African American SDP graduates, college access does not lead to college success.

- Regression analysis of the likelihood of *immediate* college enrollment found no statistical advantage for African Americans and a substantial advantage among Asian SDP graduates compared to their White, non-Hispanic counterparts.
- African American graduates were also much less likely to be retained in college through the freshman year and much less likely to earn a college degree or certificate. Asian graduates were considerably more likely to be retained in college (compared to White, non-Hispanic graduates), but statistically equally likely to graduate from college as their White, non-Hispanic counterparts. Hispanic graduates who enrolled in college were both less likely to remain enrolled for the freshman year and also less likely to earn a degree or certificate, compared to White, non-Hispanic graduates, after statistically controlling for other key factors.
- About 15 percent of all graduates had some type of disability while enrolled in a SDP high school. Those graduates with a disability had a dramatically reduced probability of enrolling in college, holding other factors constant. However, once enrolled the chances of a SDP graduate with a disability staying in college and completing college were no different compared to their counterparts without disabilities.
- After controlling for other key factors, English language learners (ELL) were as likely to enroll in college as those who did not participate in the ELL program. But somewhat surprisingly, ELL graduates were substantially more likely to be retained in college, and to earn a degree or certificate than graduates who did not participate in the ELL program.
- Low income status of SDP graduates had modest negative effects on outcomes across the board. We suspect that part of the reason for these modest effects is the widespread incidence of low-income status among SDP graduates, which reduces the variability needed to detect the impact of family income status on post-secondary success.

High School Context and Student Behavioral Traits

- High student population turnover has proven to be a vexing problem for many big city public high school systems across the nation. Regression analysis found that a school's student mobility rate exerted a negative influence on the likelihood of college enrollment and a strong negative influence on the likelihood of enrolling in college immediately after high school.
- But once enrolled high school mobility rate did not have a statistical effect on the probability of one year retention or of completing the college course of study. Sometimes interpreted as a school culture measure, the impact of this variable may be largely on a graduate's focus and direction toward immediate college enrollment.
- The impact of suspension was surprisingly small with no significant impact on college enrollment or graduation and only a modest negative effect on college freshman-year retention. We suspect that the surprisingly limited impact of suspension on the four

college outcomes examined in this study is in part the product of the extraordinarily high incidence of suspension in high school among SDP graduates. Among this group of graduates, 42 percent had a least one suspension during high school, with the majority of these students suspended two or more times. Such widespread suspension activity among graduates from a statistical viewpoint may simply serve to reduce variability in such a way as to eliminate our ability to detect a significant impact that we have found in other similar studies.

- Daily attendance while in high school is an important determinant of all four measures of college success. A one percentage point increase in daily attendance increased the likelihood of: college enrollment and immediate college enrollment by 6/10th of a percentage point; and college freshman-year retention and college completion by 7/10th of a percentage point.

Academic Proficiency

- High school GPA is an important determinant of college success for these SDP graduates. Increasing the GPA from a B- to a B+ level sharply increases the chances of completing college (by 11 percentage points). SDP graduates'
- The basic skill proficiencies of SDP graduates as measured by PSSA scores were not strong. Among SDP graduates who were PSSA test takers, 42 percent scored at the below basic level on the 11th grade reading exam and 55 percent scored at the below basic level on the 11th grade math exam.
- Regression analysis found that compared to graduates with proficient level scores, below basic reading scores had an enormous negative influence (-21 percentage points) on the probability of enrolling in college, while below basic math scores resulted in a much smaller (-10 percentage points), but still quite considerable negative influence on the chance of enrolling in college.
- Below basic reading scores had small negative impacts on the chances of college freshman-year retention (-4.5 percentage points) and more substantial negative effects (-8.3 percentage points) on college graduation. Below basic math scores had a small negative effect on college freshman-year retention (-4.7 percentage points) but no statistically significant effect on college completion (compared to graduates with proficient level scores).

Level, Sector, and Timing of Enrollment

The choices that graduating seniors make about when and where they enroll in college exert by far the most important influence on their chances of college success. Delaying enrollment in college leads to a sharp reduction in the chance of completing college and earning a degree or certificate. Enrolling in open enrollment institutions of higher learning results in a dramatic reduction in the probability of completing college and therefore on the opportunity to achieve job market gains associated with earning a two- or four-year college degree.

- College-bound graduates began their college careers at the following institutions: 40 percent in two-year public colleges, 35 percent in four-year public colleges, 23 percent in four-year private colleges, and 1 percent each in two-year private colleges and less than two-year institutions.
- Immediate enrollment was highest among those who began college in four-year public institutions (90%), followed by 60 percent in four-year private institutions and only 47 percent in two-year public colleges.

The level, sector, and timing of college enrollment have a strong influence on college freshman year retention.

- High school graduates who delayed enrollment in college were 30 percentage points less likely to remain enrolled after the freshman year compared to their counterparts who enroll in college immediately after graduating high school.
- The level (2-year or 4-year) and sector (public or private) along with timing (immediately after high school or delayed) of college enrollment also have a strong influence on college persistence and completion even after statistically controlling for other factors: Compared to graduates who enroll in four-year institutions immediately after graduating high school, the likelihood of persisting through the college freshman year is:
 - one-third lower among those who begin college (with a delay) in two-year public schools
 - 28 percentage points lower among those begin college (immediately) in a two-year public school,
 - 13 percentage points among those begin college (with a delay) in a four-year public school,
 - no different among those who begin college (immediately) in a four-year public school, and
 - 34 percentage points lower among those who begin college (with a delay) in four-year private colleges, a surprising finding.

Graduates who *delay* enrollment into a private four-year college have a dramatically reduced probability of freshman-year retention. It appears that there are two segments at the private four-year level; one that is selective and focuses on immediate enrollment of recently graduated high school seniors; and a second that is not selective and focuses on graduates who delay college enrollment. Thus, the difference in freshman-year retention rates between these two segments is extraordinary as are differences in the probability of graduation.

The likelihood of earning a college degree or certificate are also dramatically influenced by the level, sector, and timing of college enrollment.

- Graduates who enroll immediately in a private four-year college have the greatest probability of college success even after accounting for academic proficiency,

demographic and related traits as well as school context and student behavior. Compared to this group (graduates who immediately enroll in a four-year private college) the likelihood of completing college with a degree or certificate is:

- 39 percentage points lower among those who begin college (with a delay) in a two-year public school
- one-quarter lower among those who begin college (immediately) in a two-year public school,
- one-fifth lower among those who begin college (with a delay) in a four-year public or private school, and
- 6 percentage points lower among those who begin college (immediately) in a four-year public school
- The most frequent point of entry into higher education for SDP graduates is at the two-year level where 40 percent of college-bound seniors enter higher education for the first time. Slightly more than half of these two-year college-bound students delay college enrollment. Among those SDP graduates who initially enter a two-year public college with a delay after graduating high school, the chance of earning a college degree is reduced by a stunning 40 percentage points (relative to those who enroll immediately in a four-year private institution). The chance of earning a degree after initial enrollment in a two-year public institution immediately after graduating high school is better, but still drags down the chance of completion by about 25 percentage points compared to their counterparts enrolled immediately in a four-year private institution.

In summary, seven years after the expected time of high school graduation, just one in five SDP graduating seniors have earned a college degree or certificate with a small number continuing their college education. The remaining 80 percent of SDP graduates either did not enroll in college or dropped out of college before earning a degree or certificate. The low college completion rate is the product of a below average share of graduating seniors opting to enroll in college and a very high chance of dropping out of college after initial enrollment. Indeed, among all SDP graduates who did enroll in college two-thirds quit college with earning a credential seven years after their expected high school graduation.

This result suggests that for many SDP graduates formal schooling ends at high school. Indeed, more than 40 percent of SDP graduates never enroll in college. These students need to make their transition into adult labor market occupations right after high school. Yet the SDP secondary school program of study seems heavily focused on college enrollment.

Nearly six in ten SDP graduates eventually enroll in college, but many of these students do not have the proficiencies and experiences needed to complete a college degree when they leave high school. These include academic proficiency; but our research also reveals that student behavior—especially daily attendance is a key to future post-secondary education success. Daily attendance during high school plays a central role in influencing the chance of college enrollment

and completion. Improving daily attendance has the potential to greatly improve the chances of college success—even after accounting for academic proficiencies.

Both high school GPA and performance on the PSSA tests exert important influence on the chance of college success; but it is important to distinguish between the two. The GPA measure encompasses a much wider range of knowledge, skills and behavior than standardized reading and math tests and plays a much different and more important role in influencing the chance of college success. Efforts organized to improve student GPA performance may have the potential to improve post-secondary success of graduates.

The timing of college enrollment matters a lot for SDP graduates. Enrolling in college right after high school leads to markedly improved college outcomes for SDP graduates. Delaying college enrollment sharply increases the chance of failure in college. Enrolling in a two-year college sharply reduces the chance of post-secondary success. SDP graduates who enroll in four-year schools have much better odds of succeeding in college. SDP graduates who enroll in four-year college right after high school have dramatically better chances of college success than all other SDP graduates. Unfortunately, fewer than half of SDP college-bound seniors follow this path to college. Those who don't find themselves with a dramatically reduced chance of completing college even if they have the academic proficiencies and behavioral characteristics that otherwise increase college success.

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Introduction

Going to College has become the primary objective of secondary school programs in the United States. During the spring of 2013, nearly 3 million students received their high school diplomas out of which about 2 million opted to enroll in a post-secondary educational institution in the fall semester of the same year—immediately following high school completion.¹ Thus, nearly two-thirds of all U.S. spring 2013 high school graduates had enrolled in college right after high school, a proportion that will likely grow with the passage of time as those who did not immediately enroll in college may opt to return to school at the post-secondary level after an interim period of work, job seeking, or perhaps some family responsibilities after high school.

The strong focus of secondary schools on college is not surprising given the large and growing monetary and non-monetary benefits associated with a college credential. Our analysis of the employment and earnings of young adult residents of the Greater Philadelphia area found that those with an associate's degree were much more likely to be employed than their counterparts whose highest level of education was a high school diploma (81% versus 62% or 1.31 times higher). And when employed, these associate's degree college graduates earned 35 percent more than high school graduates who did not attend college (\$28,800 versus \$21,200).² Among those with a bachelor's or higher degree, the employment and earnings advantages were larger; 86 percent were employed (compared to 62% of high school graduates; 1.39 times higher), and when employed they had 88 percent higher mean annual earnings compared to high school graduates (\$40,000 versus \$21,300).

Compared to high school graduates, college graduates not only have a very large employment and earnings advantage that persists and even grows over their working lifetime, but they are more likely than high school graduates to work in jobs with many more non-wage employment benefits. College graduates are also more likely to live healthier lives and raise their

¹ U.S. Bureau of Labor Statistics, "College Enrollment and Work Activity of 2013 High School Graduates," BLS News Release, USDL -14-0657, April 22, 2014.

² Based on our analysis of 2012-13 American Community Survey (ACS) Public Use Micro Samples (PUMS data files) for 20- to 29 year old residents of the Greater Philadelphia Area who were not enrolled in school at the time of the ACS survey.

children in stable family relationships that in turn increase the chance of life success among their children as well.³

The gaps in socioeconomic outcomes of those with a college credential and those without are indeed sizable. However, enrolling in college is only a first step in the long journey to earning a college credential. Once in college, students need to persist and complete their college education with a college degree in order to fully realize the labor market and many of the other benefits of a college education. In the Greater Philadelphia area, about 89,000 or one in five individuals between the ages of 20 and 29 had exited college without a college degree. The employment and earnings advantages of this group of non-completers over their high school graduate counterparts were modest and considerably lower compared to the advantages of college graduates described above; 71.5 percent of these non-completers were employed compared to 62 of high school graduates; 1.15 times higher rate of employment; and the mean annual earnings of non-completers were only 4 percent higher than high school graduates (\$22,100 versus \$21,300).

The labor market benefits of completing some college without earning a college degree are small and, when compared to the costs of going to college—time, energy, out-of-pocket costs, opportunity costs (forgone employment and earnings)—these benefits might be even smaller or likely negative for some students, especially those non-completers who take on debt and sometimes onerous interest payment obligations to finance their education.

Large benefits associated with a college education have led many students to take on debt to pursue a college education. In addition to paying out of pocket, students use a variety of sources to finance their college education including various forms of financial aid, grants, and loans. In the academic year 2012-13, 57 percent of full-time full-year enrolled undergraduate students had used loans as a source of finance for their college education.⁴ Borrowers who complete their college education and graduate with a degree are in a better position to pay off

³ Jaison R. Abel and Richard Deitz, “Do the Benefits of College Still Outweigh the Costs?” *Current Issues in Economics and Finance*, Federal Reserve Bank of New York, Vol. 20 Number 3, 2014; Charles Murray, *Coming Apart: The State of White America*, Random House, New York 2012; Martha J. Bailey and Susan M. Dynarski, *Gains and Gaps: Changing Inequality in U.S. College Entry and Completion*, National Bureau of Economic Research Working Paper 17633, Cambridge, MA, 2011.

⁴ National Center for Educational Statistics, *Digest of Education Statistics*, 2013 Tables and Figures, Table 331.60. Retrieved from http://nces.ed.gov/programs/digest/d13/tables/dt13_331.60.asp on February 20, 2015.

their college loans and less likely to default than borrowers who don't complete.⁵ In fact, borrowers who exit college before graduation are four times more likely to default on their student loans than students who earn a degree.⁶ Non-completers who borrow to finance their truncated college education also face additional costs of a failed college investment including: reduced wealth accumulation, reduced chance of home ownership, lower credit ratings, and diminished psychological wellbeing.⁷

Unfortunately, while increasing numbers of high school graduates are enrolling in college, a large number of these students fail to earn a college degree. According to a recent report from the National Student Clearinghouse, out of 2.7 million degree-seeking students who started college in the fall semester of 2008, only 55 percent had completed a degree by the spring of 2014.⁸ Although persistence in the higher education system is closely related to academic performance and the determination and grit of students themselves, institutional characteristics are found to be important to student success in college. Those who enroll in two-year institutions are less likely to persist and successfully complete college compared to those who enroll in four-year institutions. Persistence and completion outcomes also vary by public or private control of the institution. And in more recent years, with the proliferation of for-profit institutions, it is also important to note differences between retention and completion at private for-profit versus private not-for-profit higher education institutions.

Nationwide, among students who had enrolled in college in 2009 for the first time and on a full-time basis seeking a certificate or associate's degree, only 31 percent had earned a certificate or associate's degree within three years (in 150% of the time to degree); the graduation rate of this cohort who had enrolled in a community college was less than 20 percent. Among first-time and full-time enrolled students in 2006 who were seeking a bachelor's degree

⁵ Beth Akers and Matthew Chingos, *Is a Student Loan Crisis on the Horizon?* Brown Center on Education Policy At Brookings, Meta Brown and Sydnee Caldwell, "Young Student Loan Borrowers Retreat from Housing and Auto Markets," *Liberty Street Economics* Federal Reserve Bank of New York, April 2013

⁶ Mary Nguyen, *Degreeless in Debt: What Happens to Borrowers Who Drop Out?* Education Sector, February 2012

⁷ Richard Fry, *Young Adults, Student Debt and Economic Well-Being*, Pew Research Center Social and Demographic Trends, May 2014. William Elliott and IlSung Nam, "Is Student Debt Jeopardizing the Short-Term Financial Health of U.S. Households?" *Federal Reserve Bank of St. Louis Review*, September/October, 2013, pp. 405-424.

Beth Akers, *Unanswered Questions on Student Debt and Emotional Well-Being*, The Brown Center Chalkboard, Brookings Institution, February 12, 2015.

⁸ Shapiro, D., Dundar, A., Yuan, X., Harrell, A. & Wakhungu, P.K., *Completing College: A National View of Student Attainment Rates – Fall 2008 Cohort*, Signature Report No. 8, November 2014, National Student Clearinghouse Research Center, Herndon, VA

at a four-year institution, 59 percent had graduated with a bachelor's degree in six years (150% of time to degree). The graduation rate of these students ranged from 57 percent in public institutions, 66 percent in private non-profit institutions, and only 31 percent in private for-profit institutions.⁹

Another factor that is known to influence college completion is the timing of enrollment. Students who enroll in college immediately after graduating high school are more likely to finish college and earn a credential than students who delay enrolling in college after their high school graduation. This phenomenon, the delay in the transition to college, has often been called the "gap year" and a spate of articles in popular media has espoused the benefits of a gap year.¹⁰ Indeed, many colleges and universities have begun to offer scholarships and financial assistance to finance a gap year which can be expensive if it is not properly planned and structured.¹¹

Despite the image created by popular media of the benefits of a gap year, a gap between high school and college is more common among lower SES (socioeconomic status) students. Research has found that delayed enrollment students are six times more likely to come from families in the bottom fifth than in the top fifth of the SES distribution.¹² The delay among low SES students could be for a variety of reasons including lack of academic preparation, financial barriers, early family formation, lack of focus and direction, and the like. However, students who delay their transition to college are considerably less likely to graduate than those who enroll in college immediately and among those who do graduate, a delay in the transition to college is found to increase the number of years needed to graduate from college.¹³

⁹ National Center for Educational Statistics, *Digest of Education Statistics*, 2013 Tables and Figures, Tables 326.10 and 326.20. Retrieved from http://nces.ed.gov/programs/digest/d13/tables/dt13_326.10.asp and http://nces.ed.gov/programs/digest/d13/tables/dt13_326.20.asp.

¹⁰ Hoder, Randye, "Why Your High School Senior Should Take a Gap Year," *Time*, May 14, 2014. Retrieved from <http://time.com/97065/gap-year-college/>; Suzy Strutner, "10 Reasons You Should Take a Gap Year," *Huffington Post*, 11/30/2013. Retrieved from http://www.huffingtonpost.com/2013/11/30/gap-year_n_4325969.html;

Bridges, Frances, "Should I Take a Gap Year," *Forbes*, 4/29/2014. Retrieved from <http://www.forbes.com/sites/francesbridges/2014/04/29/should-you-take-a-gap-year/>; Loftus, Margaret, "How a Gap Year Can Make Students Successful," *U.S. News and World Report*, September 23, 2014. Retrieved from <http://www.usnews.com/education/best-colleges/articles/2014/09/23/how-a-gap-year-can-make-students-successful>.

¹¹ Tugend, Alina, Bridging the Gap Between High School and College, at a Price," *The New York Times*, October 4, 2013. Retrieved from <http://www.nytimes.com/2013/10/05/your-money/an-often-costly-year-to-bridge-the-gap-between-high-school-and-college.html?pagewanted=all>.

¹² Godrick-Rab Sara and Seong Won Han, Accounting for Socioeconomic Differences in Delaying the Transition to College", *The Review of Higher Education*, Spring 2011, Vol. 34, No. 3, pp. 423-445.

¹³ Adelman, Clifford, *The Toolbox Revisited: Paths to Degree Completion from High School to College*, Office of Vocational and Adult Education, U.S. Department of Education, February 2006; Bozick, Robert and Stefanie

Signals from the labor market are clear. Going to college can greatly improve both a graduate's social and economic well-being and is a goal that is pursued by a large majority of high school graduates. However, the labor market also sends a clear signal regarding completion of a program of study; almost all of the labor market benefits of a college education are realized only upon earning a college credential.

The decision to enroll should not be made lightly. College enrollment is an investment decision with costs that are incurred in the present for a stream of benefits that will be realized in the future. Therefore, like any investment decision, the choice to enroll in college must be made in a deliberate way, with a clear information-based plan to pursue an appropriate area of study in a college that matches the students' interests, abilities, and financial resources; and a plan to complete college and earn a college degree.

In this research paper we examine the postsecondary educational experiences of high school graduates from a cohort of students who had enrolled in the 9th grade in a Philadelphia public school in school year 2003-2004. Our examination focuses on three points along the college education pathway: enrollment (including immediate versus delayed enrollment), freshman year retention, and graduation. We examine each of these outcomes for demographic and socioeconomic subgroups of students; by their in-school behavioral characteristics of suspension and attendance, and measures of academic performance including PSSA test scores and grade point average. For the retention and graduation outcomes we also examine the connection between these outcomes and the college destination (2-year or 4-year/public or private) and timing of enrollment (immediately after graduating high school or delayed). Key findings will be presented from descriptive analysis as well as logistic regression analysis and will highlight malleable factors that influence college enrollment and college success that could serve as policy levers for policymakers and practitioners to improve postsecondary success of Philadelphia youth.

DeLuca, "Better Late Than Never? Delayed Enrollment in the High School to College Transition," *Social Forces*, Vol. 84, No. 1, September 2005, pp. 531-554; Adelman, Clifford, *Answers in the Toolbox: Academic Intensity, Attendance Patterns, and Bachelor's Degree Attainment*, Office of Educational Research and Improvement, U.S. Department of Education, June 1999. Retrieved from <http://files.eric.ed.gov/fulltext/ED431363.pdf>.

A Word about Data

The findings presented in this brief are based on de-identified unit records for a cohort of students who entered the School District of Philadelphia (SDP) as 9th graders during the school year 2003-2004 and graduated from any SDP high school at any time through the spring of 2014. The measures of post-secondary enrollment and completion among this cohort of students are based on the National Student Clearinghouse (NSC) Student Tracker database that contains semester-by-semester longitudinal data on the post-secondary pathways of these students across the nation. We have combined these two unit record data sources to create a longitudinal data file that includes information on student demographic and socio-economic traits, their academic performance, measures of in-school behavioral traits, and post-secondary enrollment, retention, and graduation outcomes. The NSC data track students enrolled in virtually every college and university in the nation for each academic term; thus together, the in-school data combined with NSC data provide a comprehensive picture of SDP graduates' high school experiences and post-secondary outcomes from their high school graduation until the spring of 2014—seven years after the cohort's spring 2007 on-time high school graduation date.

College Enrollment

Among those who enrolled in the SDP system as entering 9th graders in 2003-04, a total of 9,061 students completed their high school education at an SDP school, and of this total, 5,287 graduates (58%) had enrolled in college at some point after graduation through the spring of 2014. This enrollment rate measure includes all graduates who enrolled in college both immediately after exiting high school as well as those who delayed enrollment in college all the way through the spring of 2014.¹⁴

Gender and Race-Ethnicity

While the overall college enrollment rate of this cohort of SDP high school graduates was 58 percent, there were considerable differences in the college enrollment rate across gender and

¹⁴ Immediate enrollment in college is the primary pathway of the majority of high school students in their transition into adult life. In the U.S. during the spring of 2007, about two-thirds of all graduating high school seniors in the nation had enrolled in a post-secondary program in the fall following their high school graduation. See U.S. Bureau of Labor Statistics, *College Enrollment and Work Activity of 2007 High School Graduates*, BLS New Release, USDL 08-0559, April 25, 2008. Retrieved from: http://www.bls.gov/news.release/archives/hsgec_04252008.pdf.

race-ethnicity groups (Table 1). We found a substantial gender gap in college enrollment with 63 percent of female SDP graduates enrolled in college at some point after exiting high school compared to just 52 percent of their male counterparts. In other words, 122 females from this cohort of SDP high school graduates had enrolled in college for every 100 male high school graduates.¹⁵

Table 1:
College Enrollment Status of SDP High School Graduates from the Entering
2003-04 9th Grade Cohort, By Gender and Race/Ethnicity

	(A)	(B)	(C)	(D)
Gender and Race-Ethnicity	Total, All High School Graduates	Number with College Enrollment Data*	Number Ever Enrolled	Percent Ever Enrolled (C/B)
Male	4,152	4,149	2,164	52.2%
Female	4,909	4,907	3,123	63.6%
Asian, non-Hispanic	584	583	462	79.2%
Black/African American, Non-Hispanic	6,050	6,048	3,451	57.1%
Hispanic	1,129	1,128	531	47.1%
White, Non-Hispanic	1,258	1,257	815	64.8%
Other, non-Hispanic	40	40	28	70.0%
All Graduates	9,061	9,056	5,287	58.4%

*Five students were excluded from computations of college enrollment rate because National Student Clearinghouse data were not provided for these students.

The post-secondary enrollment rate for SDP graduates also varied sharply across race-ethnicity groups. Asian SDP high school graduates had enrolled in college at a much higher rate than graduates in other race-ethnicity groups. Nearly 80 percent of Asian graduates had enrolled in college, an enrollment rate that was 1.36 times the overall average enrollment rate for all graduates. Black/African American graduates, who accounted for two-thirds of all high school diploma awards for this cohort of students, had an enrollment rate of 57 percent that was about equal to that of the overall district average of 58.4 percent. Hispanic graduates were the least likely among all race-ethnicity groups to enroll in college with a below average enrollment rate of 47 percent.

¹⁵ The college enrollment gender gap is much larger if we place it in the context of the entering 9th grade cohort since the likelihood of males exiting high school before graduation is much greater than for females. We estimate that the college enrollment gender gap for the 9th grade cohort is near 150 female college enrollees for every 100 male college enrollees.

Findings presented in Table 1 illustrate the sharp differences in enrollment rates across gender and race-ethnicity groups. However, this depiction of SDP graduates' post-secondary enrollment outcomes raises a number of questions about the underlying factors that may help educators better understand the forces creating these different outcomes between males and females and across race-ethnicity groups. For example, are the gender differences that we observed in Table 1 the product purely of gender-based factors or are some other forces at work that influence SDP college enrollment outcomes and happen to systematically vary by gender? In order to better understand these issues, we employ logistic regression analysis to disentangle the independent effects of the determinants of post-secondary enrollment for SDP graduates.

Logistic regression analysis is designed to help sort out the independent influence of key factors (as measured by the SDP student records) on the likelihood that a graduate will enroll in college. In effect, the logistic regression model holds statistically constant other factors known to influence post-secondary enrollment in order to isolate the independent effects of a given single factor on the likelihood of a student enrolling in college. We have estimated two college enrollment logistic regression models; the first model (Model 1) examines the determinants of college enrollment among SDP graduates at any time after their high school graduation through April 2014; the second model (Model 2) focuses on understanding determinants of immediate college enrollment of college-enrolled SDP graduates, that is, enrolling in college immediately after graduating high school.

Descriptive data in Table 1 revealed that male SDP graduates were considerably less likely to enroll in college than their female counterparts. Yet this finding could simply be masking the role of low-income status, academic performance, school environment, and student behaviors that characterize males (relative to females) in the likelihood of college enrollment. The results of our logistic regression models reveal the independent impact of a number of key determinants of college enrollment for SDP graduates by estimating the effect of each variable on the likelihood of a graduate enrolling in college while statistically holding constant the effect of other variables (known to affect college enrollment) that are included in the regression.

The findings from Model 1 reveal that holding other factors constant, including academic performance, student behavior, and low income status, male SDP graduates are less likely than females to enroll in college. Our analysis found that male graduates were 8.7 percentage points

less likely to enroll in college than females—even after accounting for differences in their background traits relative to female graduates.

More surprising still is our finding on Black/African American enrollment. Table 2 presents the findings on race-ethnicity from the logistic regression model (Model 1) that we developed to gain insight into the determinants of college enrollment among SDP graduates. Once we account for the independent effects of other factors known to influence college enrollment we found that Black/African American graduates were significantly *more likely* to enroll in college than their White, non-Hispanic counterparts. This finding is notable in that we found that the White, non-Hispanic enrollment rate of 64.7 was considerably greater than the 57.0 percent enrollment rate of Black/African American graduates. Yet our statistical analysis summarized in Table 2 revealed that, holding other factors constant, Black/African American students are 8.7 percent *more likely* to enroll in college than their White counterparts. How can we reconcile these two seemingly contradictory findings about the Black-White enrollment gap?

Table 2:
Regression-Adjusted* Percentage Point Effects of Race-Ethnicity (relative to the reference group-White, non-Hispanics) on the Likelihood of Enrolling in College among SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

Race-Ethnicity	Regression-adjusted* difference compared to the reference group (White students) (percentage points)
Black/African American, non-Hispanic	+8.7
Asian, non-Hispanic	+9.4
Hispanic/Latino	No statistical difference
White, non-Hispanic	Reference Group

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, and PSSA test score level.

In a separate analysis we have carefully analyzed these results and found that while the academic proficiencies of Black/African American graduates were not as strong as those of White, non-Hispanic graduates, Black/African American students with poorer academic skills were more likely to enroll in college than their White, non-Hispanic counterparts.¹⁶ That is, when

¹⁶ Neeta P. Fogg and Paul E. Harrington, *Understanding the Sources of Race-Ethnic Differences in College Success*, Center for Labor Markets and Policy, Drexel University, Forthcoming.

we account for academic proficiency, Black/African American SDP high school graduates are more likely to enroll in college than are White, non-Hispanic graduates. Table 3 examines the college-going rate of Black/African American and White, non-Hispanic graduates by three key measures of academic performance:

- High school grade point average (GPA) by quartile¹⁷, that is, each quarter of students ranked by GPA from highest to lowest. The data reveal that at the top of the GPA distribution there is almost no difference in the college enrollment rate between Black/African American and White, non-Hispanic students. About 87 percent of all students in the highest GPA quartile in both race groups enroll in college after high school. In the second quartile, containing graduates with GPAs that place them between the 50th and 75th percentile, a gap emerges with Black/African American graduates about 6.3 percentage points more likely to enroll than their White counterparts. Even at the very bottom of the GPA distribution, containing graduates in the bottom quarter of the class's GPA ranking, we found that Black/African American graduates enrolled in college about 36 percent of the time compared to about 30 percent for White, non-Hispanic students with similar levels of academic performance measured by GPA.
- The 11th Grade Math PSSA test which measures math proficiency and classifies test takers into one of four proficiency levels. Unsurprisingly, at the advanced and proficient level of the math PSSA test, the college enrollment rate was sharply above average for all graduates and the Black-White differences in college going were comparatively small. Advanced scoring Black/African American students were slightly less likely to enroll in college than their White, non-Hispanic counterparts, but at the proficient level, Black/African American students were slightly more likely to enroll relative to White, non-Hispanic graduates. At the basic level of math proficiency 73.1 percent of Black/African American graduates enrolled in college compared to 63.6 percent for White, non-Hispanic graduates, a difference of 10 percentage points in favor of Black/African American students. At the below basic math achievement level there is an equally large Black/African American advantage in college going relative to White, non-

¹⁷ Using high school GPA we have created four GPA quartiles with the lowest quartile consisting of one-quarter of all high school graduates with GPA lower than the 25th percentile (70.4 on a 0-100 scale), the second lowest quartile with GPA between 25th and 50th percentile (70.4 and 76.1), the third (second highest) with GPA between 50th and 75th percentile (76.1 and 81.9), and the fourth (highest) with GPA above the 75th percentile (81.9).

Hispanic graduates. Nearly one-half of Black/African American students with below basic math skills enroll in college compared to just 41 percent for White, non-Hispanic graduates.

Table 3:
College Enrollment Rates by GPA Quartile Groupings and PSSA Test Proficiency Levels
Among SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

	Black, non-Hispanic	White, non-Hispanic	Black (-) White Difference
Grade Point Average			
Highest Quarter	86.8%	86.9%	0.1%
Second Quartile	69.7%	63.4%	6.3%
Third Quartile	49.5%	45.3%	4.2%
Lowest Quartile	35.9%	30.4%	5.5%
11 th Grade Math PSSA Scores			
Advanced Level	92.6%	95.2%	-2.6%
Proficient	81.9%	79.8%	2.1%
Basic	73.1%	63.6%	9.6%
Below Basic	49.4%	41.0%	8.4%
11 th Grade Reading PSSA Scores			
Advanced Level	92.2%	93.5%	-1.2%
Proficient	80.4%	76.5%	3.9%
Basic	67.5%	58.8%	8.7%
Below Basic	42.9%	33.2%	9.7%

- The 11th Grade Reading PSSA test measures reading and English language proficiency and classifies test takers into four proficiency levels. Similar to our findings from the analysis of Math PSSA data, the college enrollment rate of Black/African American SDP high school graduates is in most instances stronger at lower score levels relative to White, non-Hispanic graduates. Enrollment rates at the Advanced level on the reading PSSA test were about the same. There we found an enrollment rate of 92.2 percent for Black/African American graduates, compared to 93.5 percent among White, non-Hispanic graduates; a difference of just 1.2 percentage points in the college going rate. The college going rates of Black/African American graduates are much higher than White, non-Hispanic graduates for those with basic and below basic reading skills. At the basic level, the Black/African American college enrollment advantage is nearly 9

percentage points and at the below basic the Black/African American college enrollment advantage is 10 percentage points.

Academic performance is generally considered to heavily influence the chance that a student will enroll in college after high school. Our logistic regression model for college enrollment (Model 1) includes several measures of student academic proficiency and the regression results do reveal that academic performance and achievement exert an important influence on college enrollment. (We examine the impact of these proficiencies in greater detail in a subsequent section of this paper). Nonetheless, the evidence is clear that once we account for academic performance and achievement, Black/African American SDP graduates are more likely than White, non-Hispanic graduates to enroll in college. Indeed the data in Table 3 clearly reveal that Black/African American college enrollment is stronger than that of White, non-Hispanic students at almost every level of academic proficiency but particularly so at lower academic proficiency levels, suggesting a stronger impetus to enroll in college among Blacks compared to Whites with similar academic proficiencies.

Among Asian high school graduates we also find higher college enrollment rates. As we saw in Table 1, nearly 80 percent of all Asian graduates enrolled in college after high school; a rate of college enrollment that is 1.36 times higher than the average college enrollment rate among all SDP graduates.

Part of the reason that Asian graduates are more likely to enroll is that they have, on average, sharply above average academic proficiencies—an important predictor of college enrollment. Asian students also possessed some other traits at above average rates that increase the chance of college enrollment including strong daily attendance performance, reduced chance of disability status, and enrollment concentrated in more stable high schools. We also found that Asian graduates are more likely to graduate on time from high school (within four years of entering high school) than other SDP graduates.

The logistic regression model (Model 1) measures the independent (regression-adjusted) college enrollment differential of race-ethnicity groups compared to White, non-Hispanic students (the reference group). The unadjusted gap in the college enrollment rate between Asian and White students was 14.4 percentage points; that is, the college enrollment rate of Asian SDP graduates (79.2%) was 14.4 percentage points higher than White graduates (64.8%). However,

after accounting for factors in our enrollment regression model (Model 1), we still find that Asian graduates are about 9.4 percentage points more likely to enroll in college in comparison to the reference group (White, non-Hispanic graduates)—again suggesting a stronger impetus among Asian graduates to enroll in college.

Disability Status

Disability played an important role in influencing the chance that a given graduate enrolled in college. Graduates with disabilities include those students who after an assessment were determined to have a disability that could include physical, sensory, cognitive, and emotional conditions. The disability status measure we employ includes all members of the entering 9th grade cohort who had an Individualized Education Program (IEP) at any time while they were enrolled in high school. The incidence of disability among SDP graduates was considerable; about one in six graduates had an IEP while in high school. The college enrollment rate of high school graduates with disabilities was quite low; just 27 percent of graduates with an IEP in high school had enrolled in college any time after graduation, compared to a 64 percent college enrollment rate for graduates without a disability.

We might expect that graduates with disabilities would have lower average levels of academic proficiency and other factors that are not directly related to their disability status but that may inhibit college enrollment. Yet when we hold these other factors statistically constant in our enrollment regression model, we find that graduates with a disability were still about 21.6 percentage points less likely to enroll in college than are their counterparts without disabilities. This finding clearly reveals very powerful barriers to college enrollment that are associated with SDP graduates' disability status.

School Mobility

School mobility is a measure of the pace of student turnover in a given high school during the course of an academic year. It is measured by the ratio of the flow of students who are enrolled in a given year relative to the school's student membership or level of enrollment at a point in time. For example, if 1100 students were ever enrolled in a high school over the course of a year (the flow of students), but the school's membership at a point in time, say October 1, (the stock of students) is 1000, then the school mobility rate would be calculated as $1100/1000=1.1$. High mobility schools by definition have higher rates of student turnover and are thus

characterized by a greater degree of student instability than low mobility schools. Some observers believe that turnover in schools creates an environment less conducive to positive educational outcomes.¹⁸

School mobility rates at the high school level do vary considerably in Philadelphia and there appears to be a relationship between a school’s mobility rate and the chance that a graduate from that school will enroll in college. The findings in Table 4 examine the college-going rate among high schools relative to their mean annual mobility rates over the 2003-2004 to 2011-2012 period, ranked across quartiles of mobility.

Mobility rates were calculated for each high school and then ranked from the lowest mobility rate (least student turnover schools) to the highest mobility rate (greatest student turnover schools) and assigned to graduating seniors on the basis of the school from which the student earned their SDP diploma. One-quarter of all graduates earned their diploma from high schools with mobility rates less than 1.0747. At the other end of the distribution are a quarter of graduating seniors who received their diploma from a high school with a mobility rate that was greater than 1.2871.

Table 4:
College Enrollment Rates of SDP High School Graduates from the Entering 2003-04 9th Grade Cohort by School Mobility Rate Quartile* of their High School of Graduation

Quartile Distribution of High Schools	High School Mobility Rate Range	College Enrollment Rate
Lowest Quartile	Less than 1.0747	77.8%
Second Quartile	1.0748 - 1.2063	64.3%
Third Quartile	1.2064 - 1.2870	47.1%
Highest Quartile	Greater than 1.2871	42.3%

*Quartiles based on raking students by the annual school mobility rate (2003-2004 through 2011-2012 average) of the high school from which they graduated.

When we examine SDP graduates’ college enrollment rates in the context of the quartile ranking of high school mobility rates, we find a considerable negative connection between school mobility rates and college enrollment. Graduates from low mobility high schools were much more likely to enroll in college than those who earned their diploma from a high mobility

¹⁸ Vincent Tinto has written extensively about the role of institutional stability in creating educational success at the post-secondary level. See: Vincent Tinto, *Leaving College: Rethinking the Causes and Cures for Student Attrition*, University of Chicago Press, Chicago, 1987.

high school. Indeed, the gap in college enrollment rates between the lowest and highest school mobility quartiles is about 35 percentage points.

The traits of seniors who completed their high school education do vary by school mobility rate and this does partially explain the large gap in college enrollment rates across the school mobility quartile rankings. Even after accounting for differences in the traits of graduating seniors in these schools (through logistic regression analysis) we find that school mobility has a significant negative impact on college enrollment. The regression coefficient for this variable implies that an increase in high school mobility rates of one point, say from 1.17 to 2.17, reduces the likelihood of college enrollment by 6.3 percentage points, indicating that the more stable environment created by low turnover schools has a positive impact on the chance of enrolling in college relative to similar graduates from high turnover high schools with less stable school environments.¹⁹

Timing of High School Graduation

A number of graduates from the entering 9th grade cohort of 2003-04 did not complete high school in the spring of 2007, the expected time of graduation (on time) for this cohort of SDP students. About 14 percent of all cohort graduates (1,260 out of 9,061) were delayed in completing their high school education and were awarded their diploma at some time after spring of 2007. Seniors who were delayed in graduation were much less likely to enroll in college, just 29.4 percent of students with a delayed SDP graduation enrolled in college at any time after they finished high school, compared to a 63 percent college enrollment rate for those who graduated on-time. Students who graduated with a delay did have somewhat different characteristics than those who graduated on-time.

Our regression analysis found a significant negative independent effect on the chance of college enrollment from delayed high school graduation. Students who had a delayed graduation were, holding other traits constant, 7.4 percentage points less likely to enroll in college. This finding indicates that delaying high school graduation substantially reduces the likelihood that a graduate will ever enroll in college, suggesting that delaying high school graduation measures some intrinsic quality that reduces the likelihood of college enrollment.

¹⁹ *Ibid.*

Student Attendance in High School

Attending class has long been recognized as important for the development of academic proficiency at most levels of education. Regular classroom attendance is considered to be a critical determinant of the likelihood of completing both high school and college. Regular school attendance is known to greatly improve learning outcomes. Better attendance reveals positive traits of students such as discipline, motivation to learn, better study habits, and persistence. High school students who consistently attend school and avoid behaviors that could result in suspensions demonstrate positive non-academic traits that measure some aspects of self-motivation and self-control, confidence, self-esteem, and good study habits that we suspect they carry on to postsecondary school and the labor market.

Attendance is found to be one of the strongest indicators of a student's commitment and academic engagement.²⁰ Class attendance also allows students to obtain materials that are not contained in textbooks and assigned reading materials—information from teachers and from discussions and demonstrations in class. Therefore students who attend class regularly are also expected to perform well in school, learn more, retain more information, get better grades, stay in school, and complete the program. Students who frequently miss attending school or classes not only miss important class work, but also lose access to teachers and peers who can improve their learning approaches and attitudes such as developing strong study skills, taking better class notes, utilizing information resources, increasing attention and improving communication skills, getting more involved in school activities, and developing better educational aspirations.²¹

In fact, attendance is frequently used as a key early warning indicator of academic or even non-academic trouble placing the student at a higher risk of dropping out. Excessive

²⁰ Sparks, Sarah, Districts Begin Looking Harder at Absenteeism, *Education Week*, October 6, 2010. Retrieved from: http://www.edweek.org/ew/articles/2010/10/01/06absenteeism_ep.h30.html; Fredricks, Jennifer A., Phyllis C. Blumenfeld, and Alison H. Paris, School Engagement: Potential of the Concept: State of the Evidence, *Review of Educational Research*, 74, 2004, pp.59-119; Horn, Laura, Xianglei Chen, and Clifford Adelman, *Toward Resiliency: At-Risk Student Who Make it to College*, Washington, DC: Office of Educational Research and Improvement, United States Department of Education, 1998.; Roderick, Melissa, Jenny Nagaoka, Vanessa Coca, and Eliza Moeller, *From High School to the Future: Making Hard Work Pay Off*. Chicago, IL: Chicago Consortium on Chicago Schools Research at the University of Chicago, 2009.

²¹ Conley, David T., *Redefining College Readiness, Volume 4*. A Report Prepared for the Bill and Melinda Gates Foundation. Eugene, OR: Educational Policy Improvement Center, 2007; Hossler, Don, and Frances K. Stage, Family and High School Experience Influences on the Postsecondary Educational Plans of Ninth-Grade Students, *American Educational Research Journal*, 29(2), 1992, pp. 425-451.

absenteeism is found to be a strong predictor of dropping out of school.²² Since attendance in high school correlates to better engagement in school and higher academic achievement, higher attendance rates in secondary school are found to better prepare students for college and increase their likelihood of not just enrolling in college, but also of persisting in college once they are there.²³ Indeed, a number of post-secondary institutions now use attendance as part of their early warning systems to identify students at risk of an early exit.²⁴

The attendance of SDP graduates from the 2003-04 9th grade cohort varied considerably. Graduates in the top 25 percent (highest quartile) of the attendance distribution had an attendance rate of 95 percent or higher; meaning that they attended 95 percent or more of all the potential school days. In contrast, graduating seniors in the lowest attendance quartile were in school only 83 percent or fewer of all potential school days during high school.

The findings in Table 5 reveal a strong positive relationship between high school attendance and college enrollment. Graduates ranked in the top quartile of attendance had a mean college enrollment rate of nearly 75 percent, while those in the bottom 25 percent of the attendance rate ranking had a mean college-going rate of just 40 percent; a yawning gap in the college enrollment rate of 35 percentage points between the two groups.

Table 5:
College Enrollment Rates of SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by Daily High School Attendance Rate Quartile

Attendance Rate Quartile	High School Attendance Rate Range	College Enrollment Rate
Lowest quartile	Less than 82.7425	40.1%
Second quartile	82.7425 - 89.7144	54.0%
Third quartile	89.7145 - 94.8474	64.7%
Highest quartile	Greater than 94.8475	74.8%

Even after adjusting for other traits that influence the chance that a SDP graduate will enroll in college, we found a strong and statistically significant relationship between daily high

²² Kennelly, Louis and Maggie Monrad, *Approaches to Dropout Prevention: Heeding Early Warning Signs with Appropriate Interventions*, National High School Center at the American Institutes for Research, October 2007.

²³ Finn, Jeremy D., *The Adult Lives of At-Risk Students: The Roles of Attainment and Engagement in High School*, Washington, DC: United States Department of Education, National Center for Education Statistics, March 2006; ACT, *The Role of Nonacademic Factors in College Readiness and Success*, Iowa City, IA, 2007.

²⁴ Marcus Credé, et.al Class Attendance in College: A Meta-Analytic Review of the Relationship of Class Attendance with Grades and Student Characteristics, *Review of Educational Research*, June 2010

school attendance and the likelihood of college enrollment. Our enrollment regression model found that for one percentage point increase in the daily attendance rate, the chance of college enrollment increases by 0.6 percentage points. Thus, holding other factors constant, an increase in daily attendance from say 82 percent to 92 percent is expected to increase the likelihood of college enrollment by 6 percentage points.

Academic Proficiency

Many (but not all) four-year colleges and universities use measures of academic proficiency such as GPA and standardized test scores such as SAT or ACT to predict applicants' chances of success in college. These measures are used in the college admissions process to determine whether an applicant is accepted for admission, the field of study in which he is accepted, and in many instances, the level of financial assistance that an admitted student is offered.

In contrast, most public two-year colleges do not rely on academic proficiency measures to determine admission; instead these institutions are characterized by open enrollment policies providing access to all those who wish to enroll, regardless of their academic proficiency.²⁵ This difference in the enrollment process is important since about 40 percent of all undergraduates in the U.S. are enrolled in community colleges. Among college bound high school graduates from the SDP 2003-2004 9th grade cohort, we also found that 40 percent entered the higher education system via community colleges.²⁶ The open access mission of the nation's community colleges sets them apart from some other major components of the higher education system where access is restricted largely by academic proficiency.

Despite these sharp differences in undergraduate student enrollment policy between two- and four-year level institutions, we found that academic ability still exerted a powerful influence on the likelihood that a graduate of SDP would enroll in college. As we noted earlier, we have used three measures of academic proficiency: high school GPA, 11th grade math PSSA test scores, and 11th grade reading PSSA test scores.

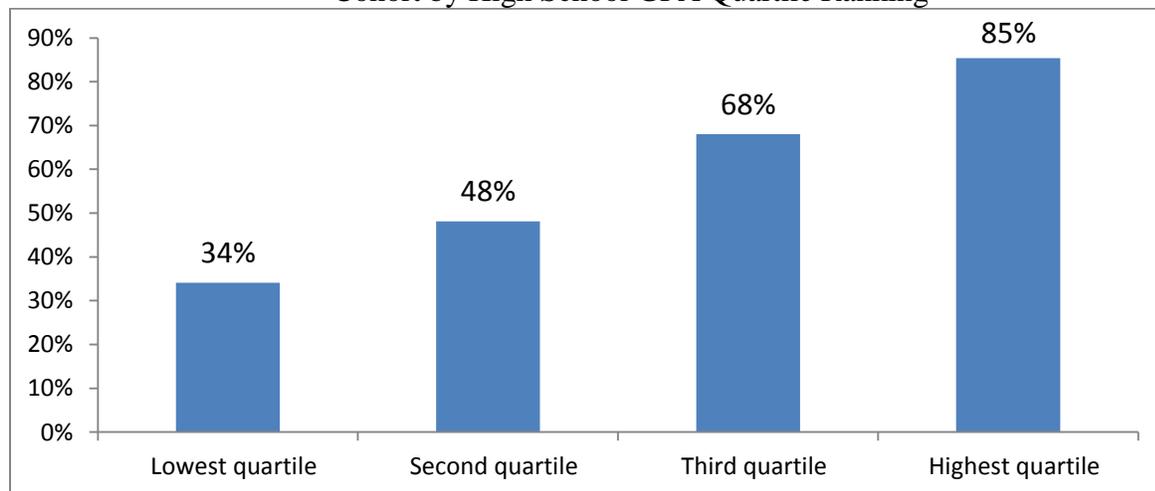
²⁵ Delores Perin and Kerry Charron "Lights Just Click Every Day," in *Defending the Community College Equity Agenda*, Bailey and Morest (eds.), Johns Hopkins University Press, Baltimore, 2006 and Henry D. Shannon and Ronald C. Smith "A Case for Community College's Open Access Mission," *New Directions for Community Colleges*, Winter, 2006.

²⁶ 35 percent of these graduates initially enrolled in four-year public institutions and 22.5 percent enrolled in four-year private colleges—including for-profit colleges as well as non-profit private college and universities. 85 percent of these graduates initially enrolled in a college located in the Tri-State region.

High school GPA provides a measure of proficiency across a wide range of abilities and knowledge areas. Cumulative GPA reflects not simply academic ability, but a set of actions taken over an extended period covering a student’s high school career. It displays students’ commitment and discipline around a set of educational objectives that create the overall GPA.²⁷ A 2011 survey of college admission officers from colleges and universities around the nation found that grades in college preparatory courses were the most important single factor in the admissions decision—followed by measures of the strength of the student’s curriculum including advanced placement and honors course-taking.²⁸ Together, course grades and curricular rigor are the fundamental elements of a graduate’s cumulative high school GPA. Colleges place heavy weight on high school grades for admission decisions since they are the best single predictor of college success—as measured by institutional retention and graduation—among new high school graduates seeking college admission.

Among SDP high school graduates we found a strong positive relationship between students’ relative position in the overall GPA distribution of the class of graduates and their college enrollment rate. Seniors with cumulative high school GPAs that placed them in the bottom 25 percent of the graduating class’s GPA distribution were least likely to enroll in college after leaving high school. We found that just over one-third of those in the bottom

Chart 1:
College Enrollment Rates of SDP High School Graduates from the Entering 2003-04 9th Grade Cohort by High School GPA Quartile Ranking



²⁷ William C Hiss and Valerie Franks *Defining Promise: Optional Standardized Testing Policies in American College and University Admissions*, National Association for College Admissions Counseling, February, 2014

²⁸ *Factors in the Admission Decision*, National Association for College Admission Counseling, <http://www.nacacnet.org/studentinfo/articles/Pages/Factors-in-the-Admission-Decision.aspx>

quartile of the GPA distribution had enrolled in college at any time after high school graduation. As the cumulative high school GPA increased, the college enrollment rate increased. Nearly 50 percent of graduates with GPAs in the second lowest quartile had enrolled in college and about two-thirds of graduates with cumulative GPA scores in the second highest GPA grouping (third quartile) had enrolled in a college or university after high school. Graduates with a cumulative high school GPA in the top quarter of the GPA distribution were even more likely to enroll in college. We found that 85 percent of the top quarter of SDP seniors (ranked by high school GPA) had enrolled in college at some time after graduating high school.

We estimated the independent effect (using logistic regression to hold other determinants of college enrollment constant) of high school GPA on college enrollment and found that GPA had a strong independent effect on college enrollment. Our analysis reveals that a 1 percentage point increase in a student's GPA increases the chance of enrolling in college by 0.454 percentage point. Let's examine the practical impact of this finding. If we have a GPA scale that ranges from 0.0 to 4.0, then our finding implies that a rise in GPA from, say, 2.5 to 3.5 would increase the likelihood of enrolling in college by an extraordinary 11.4 percentage points.

This finding highlights the central role that GPA plays in a high school graduates' decision to enroll in college. Even though a large part of the higher education system is not selective and will admit virtually any high school graduate, those graduates with low GPA scores are just less likely to enroll. And, our analysis of the determinants of college retention and graduation (presented in subsequent sections of this brief) reveals that low GPA graduates who do enroll in college have a much lower chance of ever earning a degree or credential. Thus, the decision of low GPA graduates who choose to not enroll in college, even in the open enrollment sector of the higher education system, may reflect their (more realistic and accurate) appraisal about the costs of enrolling in college relative to their chances of achieving college success.

Standardized tests of reading and math are also thought to serve as a predictor of post-high school success. Indeed, much of the impetus for high stakes testing in the nation's high schools is to measure the extent to which students have developed basic skills proficiencies that are thought to be at the level required for success both directly in the labor market as well as

succeeding in the higher education system.²⁹ The 2003-2004 SDP entering 9th grade cohort of high school graduates were administered the Math and Reading PSSA tests during their junior year in high school.³⁰ These standardized tests could be considered a somewhat limited measure of a student academic proficiency (compared to high school GPA) as they measure student achievement in only reading and math.

Most selective colleges and universities require standardized test score submission by applicants based on achievement tests that are not altogether different from the 11th grade PSSA exams, at least insofar as they provide a measure of basic skill proficiency in reading and math. These scores are required because they also serve a predictive role in identifying those applicants who are more likely to succeed once admitted to college. However, it should be noted that college admissions officers place less emphasis on standardized test scores compared to GPA measures when making college admission decisions.³¹

PSSA test scores of SDP graduates varied quite sharply among test takers, but the scores were heavily concentrated in the below basic category—42 percent had below basic scores in reading and 55 percent had below basic scores in math. At the advanced proficiency level, we found that 14 percent of these graduates achieved this highest level of achievement on the math PSSA exam while 12 percent of these test takers earned an advanced score on the reading PSSA exam.

We found a strong positive connection between the PSSA test score level and college enrollment for the math and reading PSSA tests. SDP graduates with an advanced math and/or reading score were very likely to enroll in college. Well over 90 percent of advanced score graduates enrolled in college. Graduates with a proficient level score on the math and reading 11th grade PSSA exams had enrollment rates between 78 and 80 percent, while around two-thirds of those who achieved a basic level score in the math and reading exam enrolled in a post-secondary educational institution. Graduates who scored below basic were much less likely to

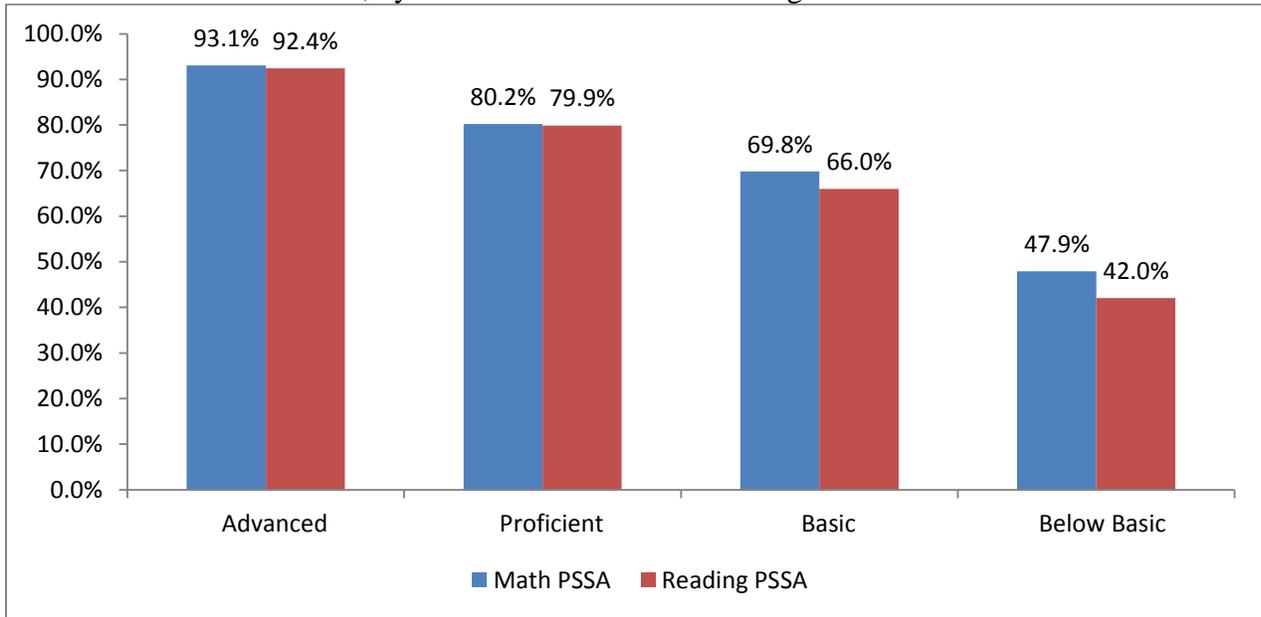
²⁹ Andrew Sum, *Literacy and the Labor Force*, National Center for Education Statistics, September, 1999; Paul Harrington and Andrew Sum, "Access Is About More Than Money," *Connection*, Fall/Winter, 1999; Paul Harrington, Neeta Fogg and Alison Dickson, *The Literacy Proficiencies of the Working Age Residents of Philadelphia City*, Philadelphia Workforce Investment Board, September, 2007.

³⁰ Test scores are available for about 85 percent of graduating seniors.

³¹ Op. cit., *Factors in the Admission...*

enroll, especially those with a below basic reading score. Just 42 percent of below basic readers ever enrolled in college.

Chart 2:
College Enrollment Rates of SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by 11th Grade Math and Reading PSSA Scores



Findings from our enrollment model (Table 6) reveals that student basic skills as measured by the PSSA exam score levels are very strong predictors of the likelihood that a graduate will enroll in college. We found that, accounting for other factors that influence the chance of enrolling in college, achieving an advanced score on the 11th grade math PSSA exam increases the chance of enrollment by more than 17 percentage points relative to graduates who achieved a proficient score level on that test (the reference group). Similarly, we found a 13.6 percentage point increase in the chance of college enrollment among those graduates who achieved an advanced score on the 11th grade reading PSSA exam compared to our reference group of graduates with a proficient score on that exam. Those graduates with a basic score on math and reading PSSA tests were modestly less likely to enroll in college compared to their counterparts with a proficient level score, but a below basic score resulted in a substantial decrease in the chance of enrolling in college compared to those with a proficient reading score.

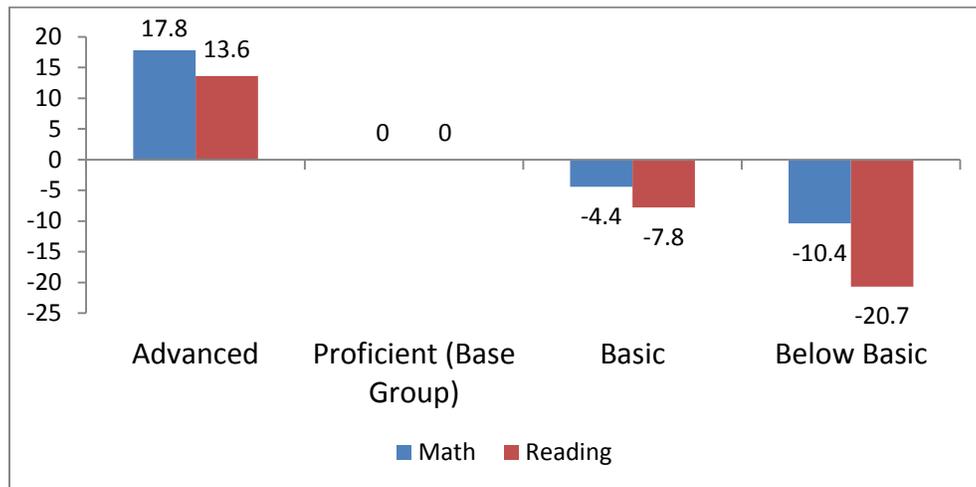
As we noted above, the largest group of SDP graduates had PSSA math and reading scores that were at the below basic level. Graduates with below basic math scores were about 10 percentage points less likely to enroll in college than the reference group (those with proficient

Table 6:
Regression-Adjusted* Percentage Point Effects of 11th PSSA Test Score Levels (relative to the reference group-Proficient level) on the Likelihood of Enrolling in College among SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

	Regression-adjusted* effect (on the college enrollment rate) of Student Performance on 11 th grade PSSA Tests	
PSSA Score Levels	Reading	Math
Advanced	13.6 percentage points <i>higher</i> likelihood of college enrollment compared to reference group	17.8 percentage points <i>higher</i> likelihood of college enrollment compared to reference group
Proficient	Reference/comparison group	
Basic	-7.8 percentage points <i>lower</i> likelihood of college enrollment compared to reference group	-4.4 percentage points <i>lower</i> likelihood of college enrollment compared to reference group
Below Basic	-20.7 percentage points <i>lower</i> likelihood of college enrollment compared to reference group	-10.4 percentage points <i>lower</i> likelihood of college enrollment compared to reference group

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, and PSSA test score level.

Chart 3:
Regression-Adjusted* Percentage Point Effects of 11th Grade PSSA Test Score Levels (relative to the reference group-Proficient level) on the Likelihood of Enrolling in College among SDP High School Graduates from the Entering 2003-04 9th Grade Cohort



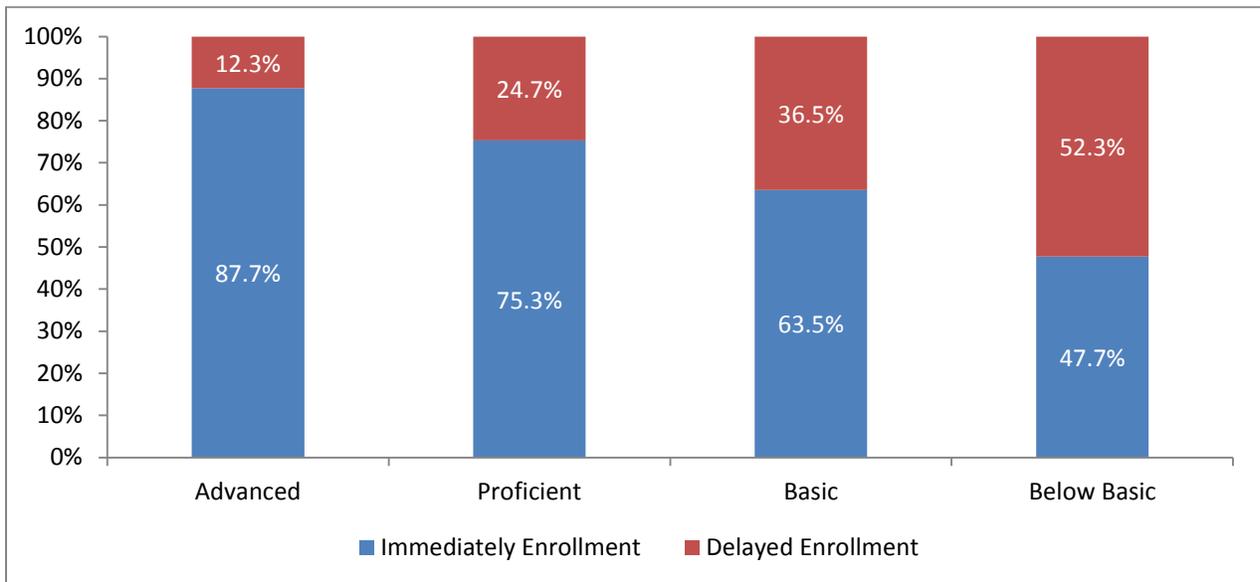
*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, and PSSA test score level.

level math PSSA score). A below basic reading PSSA score had a powerful negative impact on the chance that a graduate would enroll in college. We found that holding other factors constant, those graduates with a below basic reading score were 20 percentage points less likely to enroll in college than those graduates who achieved a proficient score.

These findings highlight the very important role that basic skills, especially reading skills, play in college enrollment outcomes of young people. These results clearly indicate that graduates with basic and especially below basic reading skills are dramatically less likely to enroll in college. Reading is the *sine quo non* for academic success and these findings suggest that college enrollment options, choices, and outcomes are heavily influenced by SDP graduates' reading proficiencies.

Basic skill proficiencies of SDP graduates not only influence the chance that a graduate will enroll in college at any point after graduation, but also the timing of enrollment. College-bound Philadelphia high school graduates who earned an advanced level score on their PSSA reading exam are very likely to time their college enrollment immediately after high school

Chart 4:
Distribution of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by Timing of College Enrollment by **Reading** PSSA Test Score Level



graduation.³² We found that 87.7 percent of college-bound graduates with advanced level score on the reading PSSA test had enrolled in college right after high school. Three-quarters of college-bound graduates with a reading score at the proficient level had enrolled in college immediately after exiting high school as did two-thirds of those with basic level reading PSSA test score. However, among below basic readers, the majority (53%) delayed enrollment in college.

The timing of enrollment appears to be an important determinant of eventual college success. Our examination of college persistence and completion in following sections of this paper finds that graduates who enroll in college right after high school are more likely to persist and complete their college education than those who delay enrollment. Timing of enrollment, by itself seems to exercise an important influence on college success for college bound SDP graduates. We explore these issues in detail in our examination of college retention and completion of SDP high school graduates in following sections of this paper.

Timing of College Enrollment

Since timing of college enrollment has an important impact on the chance of college success, we have developed a second enrollment model (Model 2) that examines the factors that influence the chances that a college-bound SDP graduate will enroll in college immediately after graduating high school or opt to delay college enrollment. Overall, about two-thirds of SDP college-enrolled students entered their first college right after graduation. Immediate enrollment rates of SDP college-bound graduates varied by their college destination. Our analysis found that 78 percent of all SDP four-year college-bound students had enrolled in college right after high school. Among those who had enrolled in four-year public colleges, 90 percent enrolled immediately after high school. However, the timing of enrollment at private four-year schools among college-bound SDP graduates was much different; we found that only 60 percent of those who had enrolled in a four-year private college did so immediately after completing high school.

³² Not all SDP graduates finish high school on time and some may graduate high school at some other point besides the SDP spring commencement. For purposes of our analysis, we define an immediate enrollment when a graduate enrolls in a post-secondary program within six months or less after exiting high school with an SDP diploma—regardless of when the diploma is earned.

Table 7:
Timing of College Enrollment by Level and Sector of Enrollment among College-Enrolled SDP
High School Graduates from the Entering 2003-04 9th Grade Cohort

Level and Sector of College Enrollment	Distribution by timing of Enrollment		Distribution of All Enrolled by College Level and Sector	
	Immediate	Delayed	Total Enrolled*	Distribution of Enrolled
Two-Year Public	47%	53%	2,117	40%
Two-Year Private	26%	74%	72	1%
Four-Year Public	90%	10%	1,820	35%
Four-Year Private	60%	40%	1,182	23%
Less than Two-Years	30%	70%	61	1%
Total			5,252	100%

*Note: The number of college-enrolled SDP graduates in this table is 5,252 (less than 5,287 total enrolled) as it excludes 35 college-enrolled students who did not have date of enrollment needed to determine immediate versus lagged enrollment.

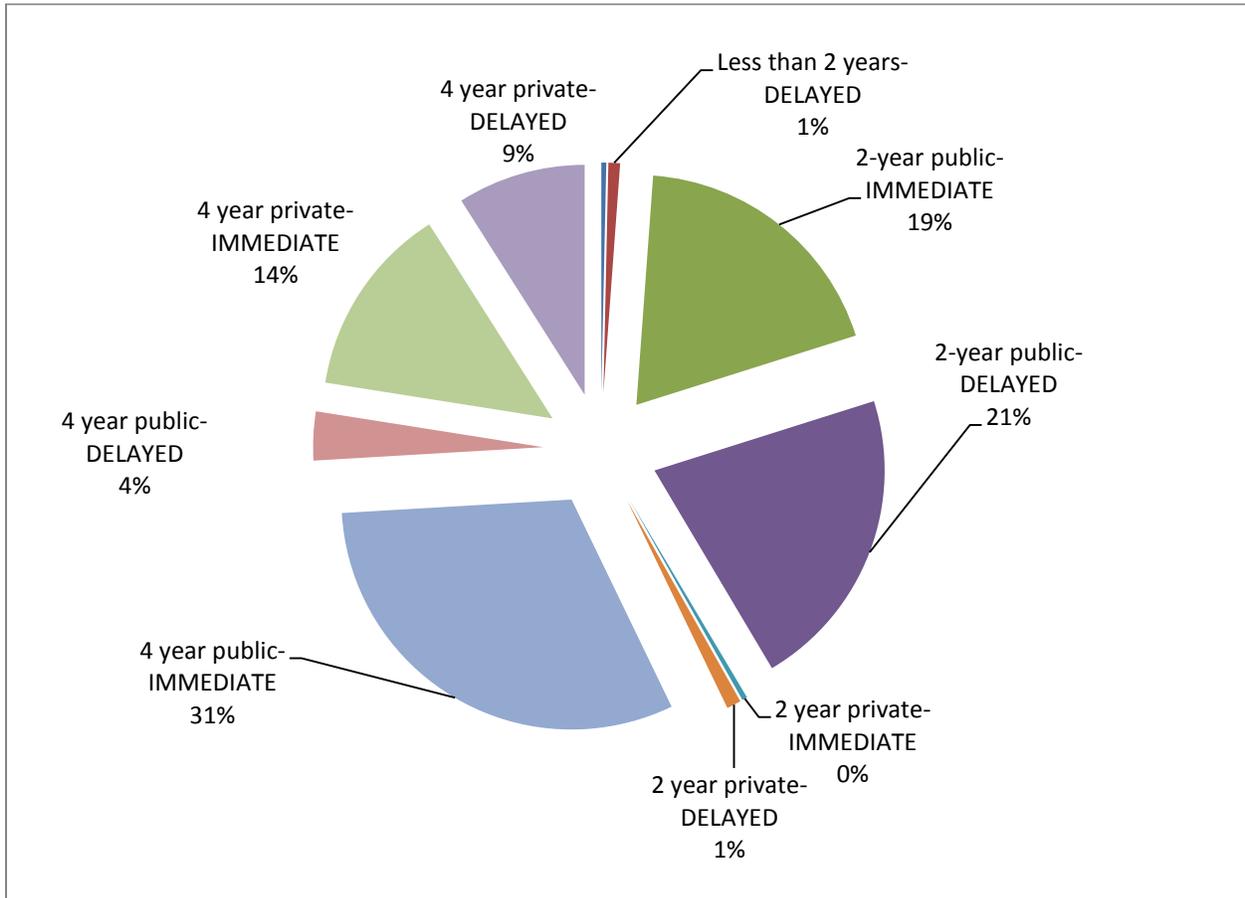
Our analysis of retention and completion found that the four-year delayed private college enrollment market is characterized by lower retention and poor graduation rates, compared to other components of the four-year college system. Indeed, outcomes of persistence and graduation among SDP college-bound students who entered four-year private institutions with a delay are starkly different from the outcomes of students who entered the remaining four-year college enrollment market segments.

At the two-year level we find much different enrollment behavior for SDP college-bound graduates. Overall, the data revealed that 40 percent of SDP college bound students enroll in a community college. However, the timing of that enrollment is much different than that observed for four-year colleges, especially public four-year institutions. More than one-half (53 percent) of all those SDP graduates who enroll in a community college delay college enrollment after graduation. Only a tiny fraction of SDP college-bound seniors enroll in less than two-year post-secondary institutions and the largest share of these also delay their college enrollment.

A variety of pathways exist for entry of SDP graduates in the post-secondary system. The most prevalent point of entry is immediate enrollment at four-year public colleges and universities, with nearly one in three SDP college-bound seniors enrolling immediately at a four institution. The second most frequently used route to college for SDP graduates is delayed

enrollment in the community college system. About one in five SDP college-bound graduates enroll in a community college with a delay after graduating high school.

Chart 5:
The Distribution of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by Level and Sector and Timing of Enrollment



Only about one in seven college bound graduates enroll in a private four-year college or university immediately after high school. Unlike those graduates who delay enrollment in a private college, these students have strong college outcomes compared to those who enter college through most of the other entry pathways. A surprisingly large fraction of SDP college-bound graduates (one in eleven) enter the higher education through delayed enrollment into a four-year private college or university.

Given our findings (in subsequent sections of this paper) on the adverse impacts of delayed enrollment on college retention and completion and that more than one in three college-bound seniors made the choice to delay enrollment, we constructed a second statistical model to

estimate the likelihood that a SDP graduate would enroll in college immediately after high school. This regression model, Model 2 (Tables 8 and 9), differs from our original enrollment regression model (Model 1, Tables 2 and 6) in two key respects. First, Model 2 is designed to predict the likelihood of **immediate enrollment** among all **college-enrolled** SDP graduates, while Model 1 predicted the likelihood of **any enrollment** among **all** SDP graduates. Second, while Model 2 includes all of the independent variables used in Model 1, it also includes variables on the higher education destination—the level (two-year or four-year) and sector (public or private) of enrollment.

Model 1 found that males were significantly less likely to ever enroll in college compared to females, but when we examine the impact of gender on immediate enrollment we found no statistically significant difference. This implies that male graduates are as likely to immediately enroll in college as females and the gender gaps that we observed in Model 1 are not the product of a reduced chance of immediate enrollment among male college-bound SDP graduates.

A surprising finding of Model 1 (presented in Table 2) was that Black/African American graduates were more likely to enroll in college than their White, non-Hispanic counterparts. Yet we find in Model 2 (Table 8) that Black/African Americans are no more likely to immediately

Table 8:

Regression-Adjusted* Percentage Point Effects of Race-Ethnicity (relative to the reference group-White, non-Hispanics) on the Likelihood of Immediately Enrolling in College among College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

	Regression-adjusted* difference in the compared White, non-Hispanics (Reference Group) (percentage points)
Race-Ethnicity	
African-American/Black, non-Hispanic	No statistical difference compared to reference group
Asian, non-Hispanic	7.9 percentage points <i>higher</i> likelihood of immediate enrollment compared to reference group
Hispanic/Latino	No statistical difference compared to reference group
White, non-Hispanic	Reference/Comparison Group

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, and PSSA test score level, and the sector, level, and Tri-State location of initial college enrollment.

enroll in college than their White, non-Hispanic counterparts. This finding implies that all of the increased likelihood of Black/African American SDP students enrolling in college is among those who delay enrollment.

Asian SDP graduates in Model 1 (presented in Table 2) had a substantially higher (regression-adjusted) propensity to ever enroll in college. We found similarly large independent effects in Model 2 (Table 8) with Asian college-enrolled graduates about 8 percentage points more likely than their White, non-Hispanic counterparts (the reference group) to immediately enroll in college. This finding suggests that much of the enrollment probability premium we found for Asian graduates in Model 1 (presented in Table 2) is the result of their greater probability of immediately enrolling in college right after the completion of high school.

Graduates with disabilities who had enrolled in college were not significantly different compared to graduates without disabilities in the likelihood of immediately enrolling in college. Yet, in Model 1 we found that graduates with disabilities had very sharply reduced probability of enrollment compared to those without disabilities.

School mobility had a very powerful impact on the chance of a SDP graduate enrolling immediately after high school. Model 2 found that college-bound students who graduated from high schools where the annual student turnover rates were quite high were much less likely to enroll in college immediately after high school than their counterparts from low student mobility rate high schools. Indeed the size of the coefficient in this model is large indicating a considerable negative effect of higher school mobility rates on immediate enrollment in college among college-bound students. The distribution of SDP graduates by school mobility in Table 4 reveals a difference of .21 between the school mobility at the 75th percentile (1.28) and the 25th percentile (1.07). According to our regression findings, a college-bound student who graduated from a high school at the 75 percentile (school mobility=1.28) is nearly 5 percentage points less likely to immediately enroll in college compared to their counterparts who graduated from a high school at the 25th percentile (school mobility=1.21). Graduates from high mobility schools are less likely to enroll in college (Model 1) and when they do enroll they are substantially less likely to enroll immediately after graduating high school (Model 2).

Daily attendance in high school is an important predictor of the likelihood of enrolling in college (Model 1) and has a strong positive relationship with immediate college enrollment as

well (Model 2). We found that the likelihood that a graduate will enroll in college rises by 0.6 percentage point with each 1 percentage point rise in the rate of daily attendance (Model 1). The regression-adjusted impact of attendance on immediate college enrollment in Model 2 was also 0.6; meaning that the likelihood of immediate college enrollment is expected to increase by 0.6 percentage point per 1 percentage point rise in the daily attendance rate.

Academic proficiencies prove to be an important force in determining the likelihood that an SDP graduate will enroll in college (Model 1, Table 6). Both GPA and 11th grade PSSA math and reading scores were important determinants of the chance that a SDP graduate would enroll in college. Our Model 2 analysis of the determinants of immediate enrollment also highlights the important role of academic proficiency in influencing the likelihood that a graduate will enroll in college right after high school. A graduate's cumulative high school GPA is an especially important factor in influencing the chance that a graduate enrolls in college immediately after high school. Model 2 findings imply that an increase in a graduate's GPA from 2.5 to 3.5 on a GPA scale that ranges from 0.0 to 4.0, would increase the likelihood of immediately enrolling in college by an extraordinary 22.5 percentage points—a measure revealing the central role that high GPA plays for the most academically proficient graduates—who opt to enroll in college right after high school.

The level of achievement attained on the PSSA math and reading tests also influenced the chance that a graduate will enroll immediately after high school (Table 9). Graduates who scored at the advanced level on the math test are about 9 percentage points more likely to enroll right after high school relative to those graduates who scored at the proficient level (the reference group). We found no statistically significant differences in the likelihood of immediate enrollment between graduates who scored at the basic level compared with those at the proficient level on the PSSA math test. Graduates with a below basic score on the math test who opted to enroll in college were only modestly (4.7 percentage points) less likely to enroll immediately relative to those with a proficient level score.

Achievement levels on the PSSA reading test also influenced the probability that a college bound SDP senior will enroll in college right after high school. Graduates with an advance reading score had a 6.4 percentage point higher likelihood of enrolling in college immediately after graduating high school compared to graduates with a proficient level reading

score (the reference group). No significant difference in the chance of immediate enrollment was found for those with a basic reading score compared to those with a proficient level score on the reading test; and graduates with below basic level score on the reading PSSA test were modestly (-3.7 percentage points) less likely to enroll in college immediately after high school compared to those who achieved a proficient level score.

Table 9:

Regression-Adjusted* Percentage Point Effects of PSSA Test Score Levels (relative to the reference group-Proficient level) on the Likelihood of Immediately Enrolling in College among College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

	Regression-adjusted* effect (on immediate college enrollment) of graduates' performance on 11th grade PSSA Tests	
PSSA Score Levels	Reading	Math
Advanced	6.4 percentage points <i>higher</i> likelihood of college enrollment compared to reference group	9.2 percentage points <i>higher</i> likelihood of college enrollment compared to reference group
Proficient	Reference/comparison group	
Basic	No statistical difference compared to reference group	No statistical difference compared to reference group
Below Basic	-3.7 percentage points <i>lower</i> likelihood of college enrollment compared to reference group	-4.7 percentage points <i>lower</i> likelihood of college enrollment compared to reference group

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, and Tri-State location of initial college enrollment.

Taken together, these findings suggest that academic proficiency; especially those abilities and traits that lead to higher grades (high school GPA) exert an important influence on the chance of enrolling in college right after graduation. PSSA test scores seem to still play a significant role in influencing the likelihood of immediate college enrollment among SDP college-bound graduates, albeit less than their influence on the likelihood of ever enrolling in college. We suspect that the sizable influence of GPA in altering the chance of immediate enrollment is a reflection of the central role that GPA plays in a selective admission process—at

institutions that recruit cohorts of entering first-time, full-time undergraduates largely from graduates fresh out of high school.

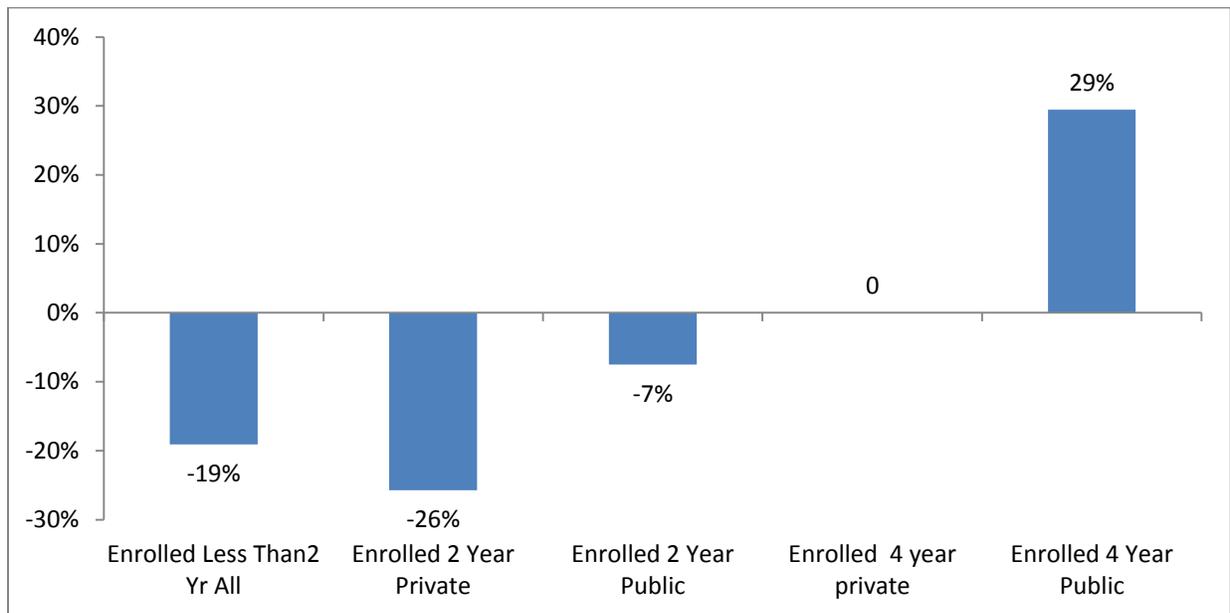
The non-selective sector of the post-secondary enrollment market is heavily focused on high school graduates who do not enroll immediately after high school. Community colleges and continuing education programs at four-year colleges and universities in the public, private non-profit, and private for-profit sectors sometimes target for admission those high school graduates who have not enrolled in college immediately after high school. Institutions operating in these segments of the enrollment markets usually have few academic requirements for admission other than a high school diploma award.

Graduates who do not enroll in college right after high school are more likely to participate in these non-selective enrollment markets. In these cases, the admission decision is determined in many instances, exclusively by the prospective student who weighs the potential gain of college enrollment against the risk of loss. Basic skills proficiencies likely play an important role in that decision. Prospective students with poor reading and math skills have a much higher chance of simply choosing not to enroll as the risks of making an enrollment investment may outweigh the potential gains. So in delayed enrollment, PSSA basic skill scores are a much more important determinant of the chance of college enrollment than in immediate enrollment markets. In immediate enrollment markets, high school GPA is the key academic performance measure, since it is used on both sides of the market exchange to create (or not) an immediate enrollment outcome.

We suspect that in non-selective enrollment markets the sorting process is conducted almost entirely by the prospective student, who makes the decision to enroll or not. In contrast, in selective enrollment markets both the prospective student and the colleges and universities in that market make the enrollment choice. Both the prospective student and the college assess the chances for success, and the college's heavy reliance on GPA as a predictor of success is reflected in the large positive coefficient for GPA in our model to estimate the chance of immediate enrollment. These conjectures, based on our analysis of the data in Models 1 (Tables 2, 6) and 2 (Tables 8, 9) suggest the need for some additional examination of the various enrollment pathways and the decision points for SDP graduates along those pathways.

The level and sector of the institution in which a graduate opts to enroll is closely connected to the chance that a graduate will enroll in college right after high school. Model 2 reveals that, holding other factors constant, graduates who had enrolled in private two-year colleges were 26 percentage points less likely to enroll immediately after high school graduation relative to graduates who had enrolled in a private four-year college. In sharp contrast, graduates who had enrolled in public four-year colleges had a 29 percentage point higher likelihood of enrolling right after high school compared to those who had enrolled in a four-year private institution.

Chart 6:
Regression-Adjusted* Percentage Point Effects of the Level and Sector of Initial Enrollment (relative to the reference group-4-year private colleges) on the Likelihood of Immediately Enrolling in College among College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort



*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, and Tri-State location of initial college enrollment.

This finding is quite remarkable. The huge advantage in immediate enrollment for those who enroll in four-year public colleges relative to those enrolling in four-year private colleges belies the image of four-year private colleges as traditional institutions that serve first-time undergraduates who just completed their high school education. Instead these findings suggest, at least in Philadelphia, the emergence of a private four-year college enrollment market segment

that is not competing in selective college enrollment markets, but is focused on enrolling somewhat older prospective students who did not enroll in college right after high school.

College Success: Freshman Year Retention and College Completion

College access does not automatically translate into college success in the form of a college credential. College enrollment is simply the first step on what is often a demanding path to college success. Nationally, out of 2.668 million students who began college in the fall term of 2008, the National Student Clearinghouse found that after six years only 1.468 million or 55 percent had completed college and earned a degree or certificate of any kind.³³ When thinking of college success, it is important to go beyond initial college enrollment and understand those factors that influence persistence and completion since many of the economic gains to enrolling in college are largely concentrated among those who earn a degree.

College outcomes of persistence and completion are determined by a complex interaction of many factors such as student traits and behaviors, institutional traits, and individuals who are involved in the process such as parents, educators, peers, and others. However, existing research on college outcomes has found that student background characteristics, behaviors, experiences, and decisions made while in high school, high school instructional programs as well as college environment play a pivotal role in shaping these outcomes.³⁴ Who the students are, what they do prior to starting college (academically and behaviorally), and where and how they attend college are all critical for shaping college outcomes. The behaviors and experiences that students bring with them to college can indirectly shape their college persistence by influencing how they adjust

³³ Shapiro, Doug, Afet Dundar, Xin Yuan, Autumn T. Harrell, & Phoebe Wakhungu, *op. cit.*

³⁴ Adelman, Clifford. *Op. cit.*; Allensworth, Elaine M. Update to: From High School to the Future, a First Look at Chicago Public School Graduates' College Enrollment, College Preparation, and Gradation from Four-Year Colleges. Chicago, IL: Consortium on Chicago School Research at the University of Chicago, October 2006; Astin, Alexander W., and Leticia Oseguera. "Pre-College and Institutional Influences on Degree Attainment," In *College Student Retention: Formula for Student Success*, edited by Allen Seidman, 245-276. Westport, CT: Praeger Press, 2005; Cole, James S., Marianne Kennedy, and Michael Ben-Avie. "The Role of Precollege Data in Assessing and Understanding Student Engagement in College," *New Directions for Institutional Research*, 141 (2009): 55-69; Kuh, George. D. Jillian Kinzie, Jennifer A. Buckley, Brian K. Bridges, and John C. Hayek. *What Matters to Student Success: A Review of the Literature*. Commissioned Report for the National Symposium on Postsecondary Student Success: Spearheading a Dialog on Student Success. Bloomington, IN: Indiana University Center for Postsecondary Research, 2006.

to the postsecondary environment and respond to the demands, opportunities, and challenges that they face in college.³⁵

The remaining two sections of this paper are focused on understanding the influence of a wide array of high school level factors including demographic and socioeconomic traits, non-academic behavioral traits, academic traits, and the college decision (timing and type of college) on whether PSD students who enrolled in college will be successful in college. We have analyzed two measures of college success: freshman year retention, and completion with a postsecondary credential or continued enrollment in pursuit of a postsecondary credential.

Freshman Year Retention

Freshman year retention is widely considered as being a particularly important step for college completion. Retention research has found that the highest risk of dropping out of college occurs during the freshman year. Students who persist through their first year of college are less likely to dropout during the sophomore year and the risk of dropping out declines with each successive year of attendance.³⁶

Below we present findings from our examination of the influence of demographic and socioeconomic traits, non-academic behavioral traits, academic traits, and the college decision (timing, level and sector of college) on the freshman year retention of PSD graduates who had

³⁵ Bean, John P. — “Dropouts and Turnover: The Synthesis and Test of a Causal Model of Student Attrition”. *Research in Higher Education*, 12 (1980): 155 –187; Bean, John P. “Interaction Effects Based on Class Level in an Explanatory Model of College Student Dropout Syndrome”. *American Educational Research Journal*, 22 (1985): 35 –64; Tinto, Vincent. “Dropout from Higher Education: A Theoretical Synthesis of Recent Research”. *Review of Educational Research*, 45 (1975): 89–125.; Tinto, Vincent. *Leaving College: Rethinking the Cause and Cures of Student Attrition*, 2nd Ed. Chicago, IL: University of Chicago, 1993.

³⁶ Astin, Alexander W. *What Matters in College? Four Critical Years Revisited*. San Francisco, CA: Jossey-Bass, 1993; Aughinbaugh, Alison “Who Goes to College? Evidence from NLSY97,” *Monthly Labor Review*, Vol. 131, No. 8 (August 2008), pp. 33-43. Retrieved from: <http://www.bls.gov/opub/mlr/2008/08/art3abs.htm>; Braxton, John M., Amy S. Hirschy, and Shederick A. McClendon. *Understanding and Reducing College Student Departure: ASHE-ERIC Higher Education Report*. Indianapolis, IN: Jossey-Bass, November 2004; Horn, Laura, *Stopouts or Stayouts? Undergraduates Who Leave College in Their First Year*. Washington, DC: National Center for Education Statistics, United States Department of Education, 1998; Klepfer, Kasey and Jim Hull. *High School Rigor and Good Advice: Setting up Students to Succeed*. Alexandria, VA: Center for Public Education, National School Boards Association, October 2012; Lee, John Michael Jr., and Anita Rawls. *The College Completion Agenda 2010 Progress Report*. New York, NY: The College Board, 2010; Schneider, Mark. *Finishing the First Lap: The Cost of First-Year Student Attrition in America’s Four-Year Colleges and Universities*. Washington, DC: American Institute for Research, October 2010; Tinto, Vincent. *Op. cit.*

enrolled in college at some point between the time that they finished high school and Spring 2014 when the National Student Clearinghouse data were extracted.³⁷

Demographic and Socioeconomic Traits

Our examination begins with the influence of demographic and socioeconomic traits of college-bound SDP graduates on their college freshman year retention. Included in the demographic and socioeconomic traits are gender, race-ethnicity, IEP and ELL status in high school, and free or subsidized school lunch status. Although all these traits were included in our analysis, the discussion below focuses primarily on those demographic and socioeconomic traits that were found to have a statistically significant independent (regression-adjusted) effect on freshman year retention of college-bound high school graduates from this cohort of SDP students (entering 9th graders in 2003-2004).

The overall freshman year retention rate stood at 64 percent. Out of 5,165 students for whom freshman year retention information was available, 3,288 had returned to college (the same college or a different college) after their freshman year, yielding a college freshman year retention rate of 64 percent. Although the freshman year retention rate was nearly identical for male and female students, there was sizable variation in the rate of freshman year retention by race-ethnicity ranging from 87 and 76 percent, respectively among Asian and White students to just 59 percent among African-American students, and 55 percent among Latino students.

A large part of this difference in freshman year retention across race-ethnic groups is attributable to differences in other traits that are closely related to college retention such as in-school behavioral traits, academic proficiency, and especially the timing of graduate's college enrollment and the level and sector of their destination college. After statistically controlling for all these traits (with logistic regression analysis) the regression-adjusted freshman year retention rate gaps across race-ethnicity groups were much smaller (Model 3). Compared to White, non-Hispanic students, the regression-adjusted freshman year retention rate was 10 percentage points *higher* among Asians, 6 percentage points *lower* among Black/African Americans, and 8 percentage points *lower* among Latino students. And compared to White

³⁷ Retention analysis in this brief excludes 35 college-enrolled students for whom freshman year retention could not be determined because the date of their first college enrollment was missing. Also excluded from the retention analysis are another 86 college-going students who had not completed a full year of college since they had first enrolled in college within one year of the extraction of National Student Clearinghouse data in April 2014.

Table 10:
Freshman Year Retention Rates of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort (Unadjusted and Regression-Adjusted*), by Race-Ethnicity

Race-Ethnicity	Freshman Year Retention Rate	Unadjusted difference compared to White students (percentage points)	Regression-adjusted* difference compared to White students (percentage points)
Black/African American, non-Hispanic	59.0%	-16.9	-6.1
Asian, non-Hispanic	87.1%	+11.2	+10.3
Hispanic/Latino	54.6%	-21.3	-8.2
White, non-Hispanic	75.9%	0.0	Reference Group
Total	63.7%	+12.2	---

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, timing, and Tri-State location of initial college enrollment.

students, the unadjusted freshman year retention rate was 11 percentage points *higher* among Asian students, nearly 17 percentage points *lower* among Black/African American students, and 21 percentage points *lower* among Latino students.

The English language proficiency of students is known to be linked with college outcomes. Limited English proficiency is generally associated with lower academic achievement. English language learners (ELL) are students who struggle to learn in English and maybe either be foreign-born students or U.S. born children of foreign-born parents from non-English speaking home countries.³⁸ ELL students are assigned specialized instructional services to overcome their language barrier to learning.³⁹ ELL students generally have academic proficiencies that are well below the average of other students.⁴⁰ Given this general experience of ELL students in American schools we expect that participation in an ELL program among these SDP students might yield lower rates of post-secondary enrollment, persistence, and completion among ELL students compared to non-ELL students.

Surprisingly, we found that in Philadelphia ELL high school graduates had a post-secondary enrollment rate that was modestly higher than that of non-ELL graduates, 61 percent

³⁸ Jessica Chan and Jen Schenkel, *Educating English Language Learners: Grantmaking Strategies for Closing America's Other Achievement Gap*, Grantmakers for Education, Portland Oregon, April 2013.

³⁹ "English Language Learners," *The Glossary of Education Reform*; retrieved from: <http://edglossary.org/english-language-learner/>

⁴⁰ Richard Fry, *How Far Behind in Math and Reading are English Language Learners*, Pew Hispanic Center (a Pew Research Center Project Report), June 6, 2007. Retrieved from: <http://www.pewhispanic.org/files/reports/76.pdf>

compared to a 58 percent enrollment rate for graduates who never participated in ELL program while in high school. The freshman year retention rate of ELL students who had enrolled in college was 10 percentage points higher than non-ELL students (73% versus 63%). Even regression-adjusted, most of the college freshman year retention advantage of ELL students over non-ELL students remained intact. The regression-adjusted college freshman year retention rate of college-bound ELL students was 7 percentage points higher than their counterparts who did not receive any ELL instructional services in high school.

There is something different about ELL students in Philadelphia compared to ELL students nationwide. A cursory examination found that Asian students are considerably over-represented among ELL students. Asian students represent 6 percent of all high school graduates in the cohort, but 38 percent of all ELL high school graduates in the cohort. A detailed examination of any particular group is beyond the scope of this paper. However, the findings in this study warrant further research of ELL students in the School District of Philadelphia.

Another demographic trait that is related to postsecondary educational outcomes is disability status. We have used IEP status during high school as a measure of disability. Students with disabilities (those who had at least one IEP during high school) who had enrolled in college were much less likely to return after their freshman year (49%) than students without disabilities (65%). However, our Model 3 logistic regression analysis found that the regression-adjusted retention rate gap between students with and without disabilities is statistically equal to zero. These regression findings, that measure the independent impact of disability status on college retention, imply that the college retention gap between college-enrolled students with and without disabilities is largely attributable to their in-school behavioral and academic traits and the timing and type of college in which they began their postsecondary career; variables that are controlled in the regression model. After statistically controlling for these attributes, the independent effect of disability status on college freshman year retention was estimated to be statistically equal to zero. These findings are similar to our previous study in Massachusetts, where we had found that although students with disabilities are much less likely to enroll in college, once enrolled in college, the independent (regression-adjusted) effect of disability on freshman year retention was statistically equal to zero.

We also found that students with disabilities were much more likely than students without disabilities to begin their college careers at a community college where retention and college completion are likely to be lower than other sectors of the higher educational system. Community college was the destination of 56 percent of college-bound students with disabilities compared to 39 percent among their counterparts without disabilities among this cohort of college-enrolled SDP high school graduates. Students with disabilities were also *less likely* than students without disabilities to enroll in college immediately after graduating high school. Only 44 percent of college-bound students with disabilities had entered college immediately after graduating high school compared to 66 percent among college-bound students without disabilities. These findings imply that the timing of college enrollment and type of destination college—are critical determinants of retention in the first year of college among SDP grads with disabilities; since after statistically controlling for these variables along with all other controls in the regression model, the estimate of the independent (regression-adjusted) effect of disability was found to be statistically equal to zero.

Non-Academic Behavioral Traits

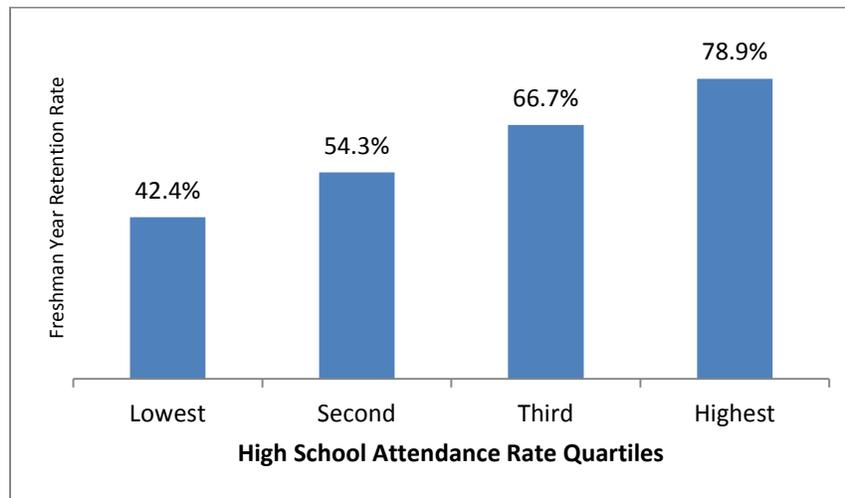
As noted in earlier sections of this paper, non-academic behavioral traits of students have been found to be important determinants of their post-secondary outcomes, particularly their persistence in higher education. Behavioral traits that are closely connected to a student's discipline, academic engagement, and commitment to school work such as high school attendance and suspension status are found to better prepare students for college so that they are more likely to enroll in college and once enrolled, they are more likely to persist in college compared to students who do not develop these behavioral traits in high school.⁴¹ We have examined the influence of two in-school behavioral traits on college freshman year retention: attendance and suspension in high school.

Our previous research of the link between attendance and college freshman year retention among three groups of high school students in Massachusetts and Rhode Island found regression-adjusted effects of between 0.5 and 1.1 percentage points. In other words, a one-point increase in high school attendance was associated with an increase in the regression-adjusted likelihood of college freshman year retention by 0.5 to 1.1 percentage points.

⁴¹ ACT. *The Role of Nonacademic Factors in College Readiness and Success*. Iowa City, IA. 2007.

In Philadelphia, a look at descriptive data shows a very strong link between high school attendance and persistence in college. Arranging SDP high school graduates from this cohort (entering 9th graders in 2003-2004) by quartiles of high school attendance rate, we found that only 42 percent of college-enrolled students in the lowest high school attendance quartile returned to college after their freshman year, compared 54 percent of those in the second quartile, two-thirds of those in the third quartile, and 79 percent among the top one-quarter of students with the highest high school attendance rate.

Chart 7:
Freshman Year Retention Rates of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by Quartile of High School Attendance Rate



Even after statistically controlling for demographic, socioeconomic, and academic traits, in-school suspension status and the timing, sector, and type of college attended (with logistic regression analysis) we found a very strong link between high school attendance and college freshman year retention; a 1 percentage point increase in attendance is expected to raise college retention by 7/10ths of a percentage point. Raising the attendance rate by 10 percentage points is expected to raise freshman-year retention rate by 7 percentage points. Given the low mean attendance rate among this cohort of SDP high school graduates (87%), there is a lot of room for improvement in high school attendance among SDP students.

Suspension while in high school was common among this cohort of SDP high school graduates. Out of 9,061 high school graduates in this cohort, 43 percent or 3,920 graduates were suspended at least once during their high school careers, with almost all of these students

required to serve at least one of their suspensions out of school (3,910 out of 3,920). Furthermore, out of the 3,920 students who were suspended, nearly 62 percent (2,413 students) had been suspended multiple times in high school.

College-bound students with suspensions in high school were less likely to return to college during the sophomore year. The college freshman year retention rate was 71 percent among college-enrolled students without any high school suspensions and only 50 percent among their counterparts with one or more high school suspensions. Regression findings reveal that even after controlling for all other factors that are known to affect college freshman year

Table 11:
Freshman Year Retention Rates of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by Suspension Status in High School

High School Suspension Status	College Freshman Year Retention Rate
With one or more suspensions	50.1%
Without suspensions	71.1%
Unadjusted Difference (Difference in the freshman year retention of students with 1+ high school suspensions relative to those without high school suspensions)	-21.0%
Regression-Adjusted* Difference: Difference in the freshman year retention of students with 1+ high school suspensions relative to those without high school suspensions	-4.2%

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, timing, and Tri-State location of initial college enrollment.

retention, the independent effect of high school suspensions was estimated to be 4.2 percentage points; that is, students with one or more suspensions during high school were 4.2 percentage points less likely to return to college after their freshman year than those who had no high school suspensions.

Academic Traits

Students with stronger academic traits are expected to outperform those with weak academic preparation in high school and in college. Academically strong students are expected to

enroll in college at higher rates and persist in their college education. Descriptive and regression analysis of freshman year retention lends support to this hypothesis. We found strong connections between the likelihood of college freshman year retention and both measures of academic traits—high school GPA and standardized test scores (PSSA reading and math test scores).

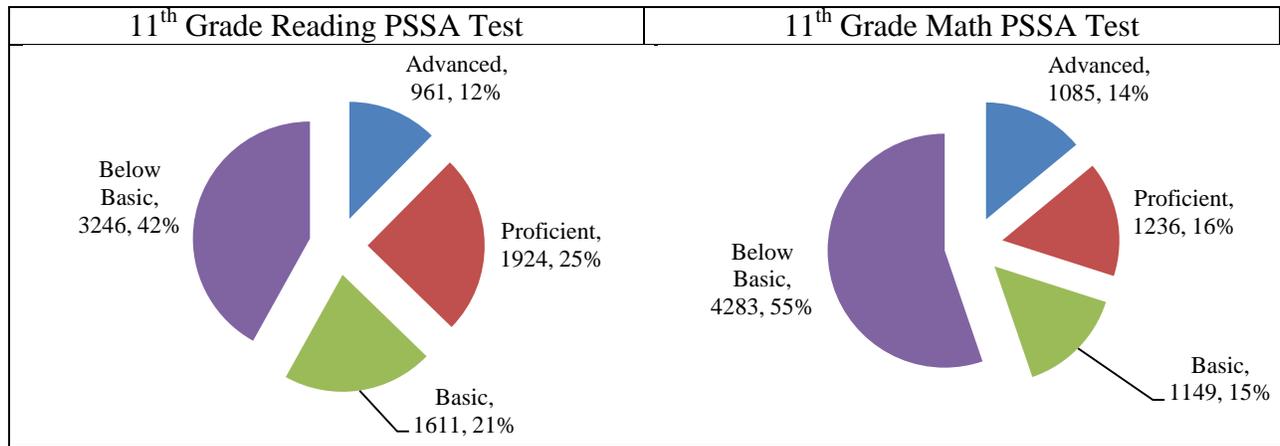
Among students who had enrolled in college, those with lower grades in high school were much less likely to return to college after their freshman year. First year college retention rates increased steadily by high school GPA; from only 39 and 46 percent, respectively, in the lowest and second lowest GPA quartiles to 64 percent in the second highest and 83 percent in the highest high school GPA quartile. Adjusting for other variables in the regression models, we found a sizable connection between high school GPA and first year college retention; measured in percentiles, a percentile increase in GPA is expected to raise first year college retention rate by 0.2 percentage points. Converting percentiles to a four point scale would mean that an increase of one point in the GPA (on a four point scale) is expected to increase freshman year retention by about 5 percentage points.

Table 12:
Freshman Year Retention Rates of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by High School GPA

Average Grade During High School (out of 100)	College Freshman Year Retention Rate
Lowest quartile (Less than 70.4)	39.4%
Second quartile (70.4 - 76.1)	46.4%
Third quartile (76.1 - 81.9)	64.4%
Highest quartile (greater than 81.9)	83.3%

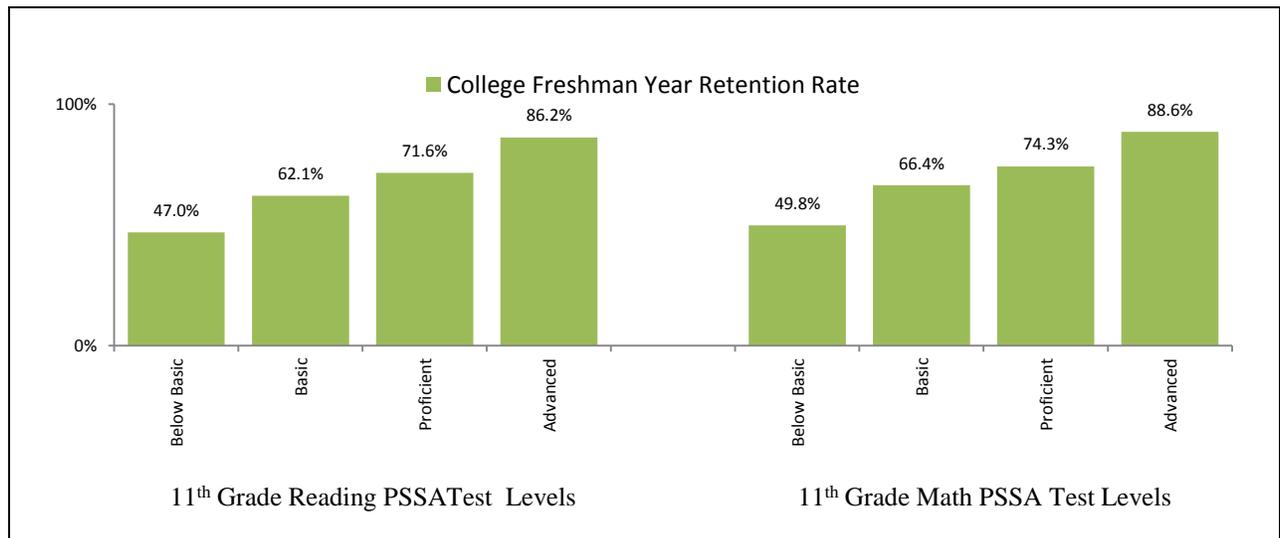
Another measure of the academic proficiency of students is their performance on the 11th grade PSSA reading and math tests. Overall more than 6 out of 10 high school graduates with valid scores on the reading PSSA test had scores in the below basic level (42%) or basic level (21%). A quarter had a proficient score and only 12 percent had an advanced level score on the 11th grade reading PSSA test. Graduates' performance math PSSA test was even worse with 70 percent scoring at the below basic (55%) or basic (15%) levels. The remaining had either scored at the proficient (16%) or advanced (14%) levels.

Chart 8:
Distribution of SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by 11th Grade PSSA Test Score Levels



Retention in the first year of college is closely related to 11th grade PSSA test performance. Students with the best performance on the PSSA test (advanced level) had a much higher likelihood of returning after their college freshman year (over 86% among advanced level performers on the reading test and nearly 89% of those with advanced level scores on the math test) whereas less than one-half of those with the lowest (below basic) level of performance on 11th grade PSSA tests returned to college after their freshman year.

Chart 9:
Freshman Year Retention Rates of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by 11th Grade PSSA Test Score Levels



Regression-based connections between college freshman year retention and performance on the PSSA test reveal that even after the effects of other variables (demographic, socioeconomic, behavioral, sector and type of college, and GPA) are statistically controlled, the connection between PSSA test performance and college retention remains; albeit not as strong as that found in descriptive analysis and only at the highest and lowest levels of performance. Findings from logistic regression analysis of college freshman year retention provide estimates of the independent effect (on retention) of three levels - below basic, basic, and advanced—of performance of students on each PSSA test compared to students who had scored at the proficient level on that test (the reference group).

Findings reveal that relative to students who had scored at the proficient level on the 11th grade reading PSSA test, college retention was 8.2 percentage points *higher* among those with advanced level scores and 4.5 percentage points *lower* among those with below basic level

Table 13:
Regression-Adjusted* Percentage Point Effects of PSSA Test Score Levels (relative to the reference group-Proficient level) on the Likelihood of College Freshman Year Retention among College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

	Regression-adjusted* effect (on the college freshman year retention rate) of graduates' performance on 11 th grade PSSA tests	
PSSA Score Levels	Reading	Math
Advanced	+8.2 percentage points <i>higher</i> likelihood of freshman year retention compared to reference group	No statistical difference compared to reference group
Proficient	Reference/comparison group	
Basic	No statistical difference compared to reference group	No statistical difference compared to reference group
Below Basic	-4.5 percentage points <i>lower</i> likelihood of freshman year retention compared to reference group	-4.7 percentage points <i>lower</i> likelihood of freshman year retention compared to reference group

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, timing, and Tri-State location of initial college enrollment.

scores on the reading test. There was no statistical regression-adjusted difference in college retention between students with proficient and basic level reading PSSA scores.

Performance on the math PSSA test had somewhat different regression findings. There were no statistical (regression-adjusted) differences between the college freshman year retention of students with basic and advanced level scores on the math PSSA test relative to those with proficient level scores on that test. However, students with below basic performance on the math PSSA test are 4.7 percentage points less likely to return to college their sophomore year compared to the reference group—students with proficient level scores on that test.

Even after controlling for all other variables students with poor performance on PSSA tests (in both subjects) are nearly 5 percentage points less likely than those with proficient level performance to return to college during the sophomore year. On the reading test, students with advanced level performance were considerably more likely (8.2 percentage points) than their counterparts with proficient level performance to stay enrolled in college after their freshman year.

Both measures of academic performance while in high school are expected to have a sizable impact on the likelihood of freshman year retention in college. This finding is not surprising as academically proficient students are more likely to be prepared for college-level work. Standardized test scores measure academic preparation on the subjects that are covered on the test, but GPA is a more comprehensive measure of academic performance over 4 or more years of high school and across an array of courses representing many different subjects. The two measures are a gauge of somewhat different aspects of academic proficiency.

Destination and Timing of College Enrollment: Level, Sector, and Timing of Initial College Enrollment

The college enrollment choice is a complex decision and our research suggests that two of the more important elements of that decision-making process are *when* to enroll (immediately after graduating high school or later) and *where* enroll (institutions in the public or private sector, at the two-year or four-year level). Research has found these decisions to be critical to college persistence and completion outcomes.⁴² Persistence and graduation outcomes vary widely by the

⁴² Choy, Susan P. *Access and Persistence: Findings from 10 Years of Longitudinal Research on Students*. Washington, DC: American Council on Education, Center for Policy Analysis, 2002; Dickson, Alison H. *First Steps*

timing and type of college in which students begin their postsecondary careers. A recent study by the National Student Clearinghouse of a cohort of students who first enrolled in college in 2008 found that after six years in 2014, the completion (graduation) rate varied from 39 percent among those starting in two-year public (community) colleges and 38 percent among those who started in four-year private *for-profit* institutions, to 63 percent among those who began in four-year public colleges and 74 percent among students who started college at a four-year private *non-profit* college.⁴³

The distribution of college-bound high school graduates from the 2003-2004 ninth grade cohort reveals that 40 percent began their college careers at a community college, 35 percent at a four-year public institution, and 23 percent at a four-year private institution. A look at the timing of initial college enrollment found that while 64 percent of all college bound students had enrolled in college immediately after graduating high school, the share of college-bound students

Table 14:
College Type and Timing of Initial Enrollment of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

Percent Distribution of College-Enrolled by Type of Starting College	Percent of College-Enrolled who Had Enrolled Immediately after Graduating High School														
<p>A pie chart illustrating the distribution of college-enrolled students by the type of starting college. The largest slice is 'Two-year public' at 40%, followed by 'Four-year public' at 35%, 'Four-year private' at 23%, 'Two-year private' at 1%, and 'Less than two years' at 1%.</p>	<table border="1"> <thead> <tr> <th>Sector and Level of Starting College</th> <th>Percent Immediately Enrolled</th> </tr> </thead> <tbody> <tr> <td>Two-year public</td> <td>47%</td> </tr> <tr> <td>Four-year public</td> <td>90%</td> </tr> <tr> <td>Four-year private</td> <td>60%</td> </tr> <tr> <td>Two-year private</td> <td>26%</td> </tr> <tr> <td>Less than two-year</td> <td>30%</td> </tr> <tr> <td>Total</td> <td>64%</td> </tr> </tbody> </table>	Sector and Level of Starting College	Percent Immediately Enrolled	Two-year public	47%	Four-year public	90%	Four-year private	60%	Two-year private	26%	Less than two-year	30%	Total	64%
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on the Ladder to College Success: Understanding the Secondary School Level Factors that Determine the College Enrollment and Retention Outcomes of High School Graduates in Massachusetts. Boston, MA: Political Science Department Northeastern University, May 2011; Harrington, Paul E., Neeta P. Fogg, and Christine Shaw. White Paper: College Access and Retention of Career and Technical Education Graduates. Cambridge, MA: Rennie Center for Education Research and Policy, 2009; Kinnick, Mary K., and Ken Kempner. "Beyond "Front Door" Access: Attaining the Bachelor's Degree," *Research in Higher Education*, 29(4) (1988): 299-318.; Shapiro, Doug, Afet Dunder, Mary Ziskin, Xin Yuan, and Autumn Harrell. *Completing College: A National View of Student Attainment Rates – Fall 2007 Cohort*. Herndon, VA: National Student Clearinghouse Research Center, December 2013; Velez, William. "Finishing College: The Effects of College Type" *Sociology of Education*, 58 (1985), pp. 191-200.

⁴³ Shapiro, Doug, Afet Dunder, Xin Yuan, Autumn T. Harrell, & Phoebe Wakhungu, *Op. cit.*

who had enrolled in college immediately after high school varied by initial school of enrollment from 90 percent in four-year public institutions, 60 percent in four-year private institutions and only 47 percent in community colleges.

The freshman year retention rate varied widely by sector and type and timing of initial college enrollment. The highest freshman year retention rate was among students who started college at a four-year public school (81%), followed by 68 percent among those with initial enrollment at a four-year private college and only 47 percent among students who had first enrolled at a community college.

Students who began college immediately had a sizable advantage (30 percentage points) in freshman year retention relative to those who delayed entry into college; 74 percent versus 44 percent. An examination of college retention rates by combining the sector-type and timing of initial enrollment reveals the importance of both factors on retention. Students who began college at a four-year private institution and had enrolled immediately after graduating high school had the highest rate of freshman year retention, 87 percent. In sharp contrast, the retention rate in the same sector and level (four-year private) among students who had delayed college entry was the lowest (38%) compared to the retention rate of all six groups of college-bound students in Table 15.

Table 15:
Freshman Year Retention Rates of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort, by Sector, Level, and Timing of Initial Enrollment

Sector and Level of Starting College	Immediately Enrolled	Delayed Enrolled	All Enrolled
Two-year public	52%	43%	47%
Four-year public	83%	66%	81%
Four-year private	87%	38%	68%
Total	74%	44%	64%

This is a surprising finding that warrants further research. That the freshman year retention of students who start college at a four-year institution is sharply different by the timing of their initial enrollment strongly suggests that there is something different about the four-year private institutions that are the destination of students who delay their college enrollment (or those parts of the four year private market segment that target students who delay college enrollment).

This research and examination requires more specific data on enrollment retention and completion that identifies each college. Unfortunately, , we are unable to gain access to data that would allow us to better understand the characteristics of this highest failure segment of the Tri-State region's private colleges and universities.

The freshman year retention rate of students who had first enrolled at a four-year public institution was 83 percent among those who had enrolled immediately and 66 percent among those who had enrolled with a lag. Students who began their postsecondary education at a community college had low overall retention rates, but at these institutions we also found students who began college immediately after graduating high school were more likely to return to the postsecondary system in the sophomore year (52%) than if they waited to enroll in a college (43%).

Findings from our logistic regression analysis reveal that even with regression controls of demographic and socioeconomic traits, in-school behavioral traits, academic preparation, school mobility rate, and institution sector and type of initial enrollment, the timing of college enrollment has a strong independent effect on the freshman-year retention rate. Regardless of the type of institution, delayed enrollment has a strong negative effect on college freshman year retention.

Regression estimates reveal that relative to students enrolled immediately in a four-year private institution (the reference group), delayed college enrollment is expected to *reduce* freshman year retention rate by about 34 percentage points among those starting college at a four-year private institution, about 33 percentage points among those who began their delayed college enrollment at a community college, and 14 percentage points among delayed enrollees at a four-year public institution.

The finding of an equally large (regression-adjusted) negative effect of delayed enrollment among students beginning college at four-year private institution and a community college—is surprising and lends support to the need for further research on the types of four-year institutions that are the destination of delayed entry students versus those that are the destination of high school graduates who immediately enroll in college. We suspect fundamental differences in the educational and business models between private colleges that enroll traditional freshmen right after high school and those that enroll students who delay college enrollment.

Table 16:
Regression-Adjusted* Percentage Point Effects of the Level, Sector, and Timing of Initial Enrollment (relative to the reference group - four-year private, immediately enrolled) on the Likelihood of College Freshman Year Retention among College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

Starting Institution and Timing	Regression-Adjusted* Percentage Point Effect on College Freshman Year Retention Rate (Relative to Students who Started College at Four-Year Private Colleges, Immediately)
Two-Year-Public, Immediately	-28.8
Two-Year-Public, Delayed	-32.3
Four-Year-Public, Immediately	No statistical difference
Four-Year-Public, Delayed	-13.5
Four-Year-Private, Delayed	-33.6
Four-Year Private, Immediately	Reference Group

*Note: Logistic regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, timing, and Tri-State location of initial college enrollment.

The sector and type of the starting college also have sizable regression-adjusted effects on freshman year retention. Compared to the reference group (those who began college immediately at a four-year private institution) the regression-adjusted freshman year retention is expected to be *lower* among those who started at a community college (-29% to -33%). Regression analysis also found that students who started college at four-year public institutions and delayed college entry are 14 percentage points *less likely* than the reference group (those who began college immediately at a four-year private institution) to return in the sophomore year whereas those entering four-year public immediately after graduating high school were equally likely as the reference group to return in the sophomore year.

Also important to college freshman year retention is the location of the starting college. While we were unable to identify the individual states of the colleges where these students began their postsecondary education, we did have information on the whether the starting college was in the one of the three states in the Tri-State area: Pennsylvania, New Jersey, and Delaware. A large majority (85%) of college-bound SDP students from this cohort had begun their college career close to home—in a higher education institution located in the Tri-State area. The college freshman year retention rate of these close-to-home college goers was modestly higher (by 8

percentage points) than that of students who went beyond the Tri-State area to attend college (65% versus 57%).

Even after controlling for several traits of students, their high schools, and starting colleges, the regression-adjusted college freshman year retention rate advantage of Tri-State college goes over students who started college outside the Tri-State area, remained positive, and significant —4.5 percentage points. Attending college closer-to-home clearly provides advantages to SDP students that allow them to persist in college. Study of the college location preferences among ACT test takers found that a majority of students preferred to attend in-state colleges (likely for the in-state tuition benefits of public colleges). Students who attended colleges that matched their preferences (including preferences of location, distance from home, and type of college) were less likely to transfer to find a better match with their preferences, resulting in an increased likelihood of persisting in college.⁴⁴

Freshman year retention is an important second step in the college journey and key to the final outcome of completing college with a credential. Our analysis has found several malleable factors that influence the likelihood of SDP students persisting through the first year of college and returning to start the second year. In particular, in-school behavioral traits appear to have a sizable influence on college persistence. Of course, improving high school academic preparation is critical to improving postsecondary educational outcomes. However, improving non-academic traits of students can also make a considerable difference in college retention. Strategies to increase school attendance and change behaviors to reduce school suspensions can make sizable differences in college persistence. The timing of enrollment in college and the choice of college are critically important in improving the likelihood of freshman year retention. Strategies to sharpen student focus in the college decision-making process with increased information-based guidance have the potential to result in better college choices and significantly better retention in college.

⁴⁴ ACT, *College Choice Report, Part 3: Persistence and Transfer: A Profile of 2012 ACT-Tested High School Graduates*, 2014.

College Completion

Many of the economic and non-economic gains of the *Going to College* goal are achieved when the student completes a course of study and earns a college credential. While completing the freshman year and returning for the sophomore year gets the student closer to this goal, it takes persistence beyond the freshman year to translate college access to a college credential. Nationally, only 55 percent of those who began college in the fall term of 2008 had earned a college credential (a degree or certificate).⁴⁵ College success is achieved when the course of study is completed with a credential. Although most of the college dropout activity occurs in the freshman year, additional students continue to dropout even after the freshman year, leaving a much smaller cohort of students at the graduation ceremonies compared to the group that shows up at freshman year convocation ceremonies.

As noted in a previous section of this paper, completing college and earning a degree, on average, comes with sizable labor market rewards, not only compared to those with just a high school diploma, but also compared to those who complete some college education but fail to earn a college credential—also known as the Sheepskin Effect. Two competing economic theories are typically used to explain the employment and earnings benefits of workers with college degrees over workers with some college education without a degree. According to the first, the sorting theory, credentialed workers are paid more because employers use college completion as a signal to identify workers with desirable traits.⁴⁶ The second theory, human capital theory, argues that students who persist through college and graduate are good at school and learning, have developed a set of specific knowledge traits valued in the labor market and therefore are, on average considerably more productive and better-paid workers than those without a college diploma.⁴⁷ Some supporters of the human capital theory also contend that a lot more learning occurs closer to graduation than in the initial years of college. Consequently, completers have

⁴⁵ Shapiro, Doug, Afet Dunder, Xin Yuan, Autumn T. Harrell, & Phoebe Wakhungu, *Op. cit.*

⁴⁶ Arrow, Kenneth J., “Higher Education as a Filter,” *Journal of Public Economic*, Vol. 2, Issue 3, July 1973, pp. 193-216;

Stiglitz, Joseph E., “The Theory of ‘Screening,’ Education, and the Distribution of Income” *American Economic Review* Vol. 65, No. 3, June 1975, pp. 283-300; Weiss, Andrew, “Human Capital vs. Signaling Explanations of Wages,” *Journal of Economic Perspectives*, Vol. 9, No. 4, Fall 1995, pp. 133-154.

⁴⁷ Becker, Gary, *Human Capital; a Theoretical and Empirical Analysis, with Special Reference to Education*. New York: Columbia University Press, 1964; Lange, Fabian and Robert Topel, “The Social Value of Education and Human Capital,” in Eric Hanushek and Finis Welch (eds.), *Handbook of the Economics of Education*, Vol. 1, Amsterdam: North-Holland, 2006.

more human capital and are therefore more productive in the labor market and earn higher wages than non-completers.

Regardless of whether the labor market benefits to credentialed workers occur due to sorting or human capital, there is strong evidence of a sizable earnings premium from completing a college degree compared to completing some college education without a degree. Our analysis of the employment and earnings of young adult residents of the Greater Philadelphia area found that those with an associate's degree or a bachelor's degree were much more likely to be employed than those with some college but no degree (81% for associate's degree grads and 86% for bachelor's degree grads versus 71.5% for non-completers); and when employed, completers had quite a sizable annual earnings premium over non-completers with mean annual earnings of \$28,800 for associate's degree grads and \$40,000 for bachelor's degree grads versus just \$22,100 for non-completers.⁴⁸

The 2003-04 cohort of SDP 9th graders began with 9,061 high school graduates out of which 5,287 had enrolled in college. An examination of the college enrollment and graduation status of these students in April of 2014⁴⁹ revealed that about one-third of college goers (1,774) had earned a college credential at some point between initial enrollment and April 2014, and 98 (1.9%) were still enrolled in college in April 2014. The remaining 3,415 were not enrolled in college in April 2014 and had not earned a credential. Thus, slightly over 35 percent of those who had ever enrolled in college had either earned a credential or were still enrolled in college.⁵⁰ Among the 1,774 students who earned a college credential, most (74%) had earned a bachelor's or higher degree and another 16 percent had earned an associate's degree or a certificate. The type of credential is unknown for the remaining 3 percent of completers.

⁴⁸ Based on our analysis of 2012-13 American Community Survey (ACS) Public Use Micro Samples (PUMS data files) for 20- to 29-year-old residents of the Greater Philadelphia Area who were not enrolled in school at the time of the ACS survey.

⁴⁹ College enrollment, retention, and graduation analysis in this brief is based on data from the National Student Clearinghouse. NSC data contains longitudinal semester-by-semester enrollment activity of students. NSC data for the 2003-04 9th grade SDP cohort were extracted in April 2014 which means that the data contain enrollment/graduation status of college-going students from this cohort in the spring semester of 2014 and for each semester before to the time of their first enrollment in college.

⁵⁰ Students who had not dropped out of college without earning a credential and were still enrolled in college working towards earning a credential are considered successful and are therefore included in our measure of completers. While there are only 98 such students, we believe that these students should be included in a measure designed to gauge success. Therefore instead of using the term "graduation rate" we use the term "completion or success rate" to include not only students who have completed college but also those who are working towards completing college.

For the most part, logistic regression findings on completion rates are quite similar to the regression findings for freshman year retention. This is not surprising because completing additional years of college (needed to earn a credential) is likely to require similar traits that are needed to complete the first year of college. In fact, as noted in the previous section, research has found that college dropout activity is concentrated in the first year and the risk of dropping out declines for each consecutive year thereafter. This is also evident among this cohort of SDP students. A freshman year retention rate under 64 percent (63.7%) and a completion rate over 35 percent (35.3%) means that 36 percent of college goers in this cohort dropped out in the first year and over the remaining 3 to 5 years (given that three-quarters of the credentials were a bachelor's or higher degree), 29 percent had quit college.⁵¹

Demographic and Socioeconomic Traits

Descriptive analysis of completion rates found sizable differences across demographic and socioeconomic groups, particularly gender, race-ethnicity, and ELL status in high school. The completion rate among college-goers (share of college-enrolled students who had completed college or were still enrolled in college in April 2014) varied by gender with females more likely to complete college than males. Even though their freshman year retention rates were the same, persisting beyond the freshman year and all the way to completion was somewhat (3 percentage points) lower among male students than among female students.

This gap remained at the same level in the regression findings that estimate the 'independent effect' of variables, that is, the independent effect of gender after statistically controlling for the effects of other variables included in the regression that are known to affect college completion (other demographic traits, socioeconomic and in-school behavioral traits, academic proficiencies, and the timing and type of college). Even with the regression controls, male students were 3 percentage points *less likely* to complete college than female students implying a somewhat stronger long-term perseverance or stick-to-itiveness among female SDP students compared to male students.

⁵¹ This is a summary calculation and not a longitudinal calculation of the actual pathways of students. It is entirely likely that some of the 36 percent who quit in the first year may have returned later and either completed or dropped out again. A detailed examination of the actual postsecondary pathways of each student could provide insights on this issue. Unfortunately, such an examination (of the actual postsecondary pathways of students) is beyond the scope of this paper.

Completion rate gaps were quite large by race-ethnicity of students. Among college-enrolled students, only 29 percent of African Americans and 32 percent of Latino students had completed college by the spring of 2014 (when the National Student Clearinghouse data were extracted). In contrast, slightly over 53 percent of White students and a little under 58 percent of Asian students had completed college—either earned a credential or still enrolled in college. After statistically controlling for other determinants of college completion (Model 4), the regression-adjusted gap between the completion rates of White students and Asian students was statistically equal to zero. However, African American and Latino students were, respectively, 11 and 6 percentage points *less likely* to complete college compared to White students even with regression controls.

Table 17:
Percent of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort who had Completed College or Were Still Enrolled in College as of April 2014 (Unadjusted and Regression-Adjusted), by Race-Ethnicity

Race-Ethnicity	Percent Graduated or Still Enrolled	Unadjusted difference compared to White students (percentage points)	Regression-adjusted* difference compared to White students (reference group) (percentage points)
Black/African American, non-Hispanic	28.8%	-24.3	-10.8
Asian, non-Hispanic	57.6	+4.5	No statistical difference
Hispanic	32.4	-20.7	-5.9
White, non-Hispanic	53.1	0.0	Reference Group
Total	35.4	-17.7	---

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, timing, and Tri-State location of initial college enrollment.

Regression-adjusted differences in completion across race-ethnic groups are much smaller than unadjusted differences. This implies that some of the gaps in completion are attributable to differences between race groups in traits that are closely related to persistence and completion in college and are included in our logistic regression models (such as behavioral traits, academic proficiency, and most importantly, the timing of college enrollment and the type of starting college). But even after statistically controlling for these covariates, some of the gaps in college completion across race groups remain, which means that even while the regression

models include a wide variety of explanatory variables, it is not possible to account for every variable because of restrictions on data availability and the existence of some variables that may influence completion but are not measurable.

College-goers who were English Language Learners (ELL) in high school were considerably more likely (10 percentage points) than their non-ELL counterparts to complete their college education (45% versus 35%). Even after statistically controlling for other determinants of completion in the logistic regression, the completion advantage of ELL students over non-ELL students remained high at 6.7 percentage points. These findings are similar to the findings of freshman year retention rate advantage of ELL students over non-ELL students. Among SDP students, not only were English Language Learners more likely to persist in college than English proficient students, but they were also more likely to stay the course and complete college with a credential than non-ELL students.

A comparison of the completion rate by disability status found that only 23 percent of college-enrolled SDP high school graduates with a disability (those who had at least one IEP during high school) had completed college with a credential or were still enrolled in college. Among their counterparts without disabilities, the completion rate was 36 percent; an advantage of 13 percentage points. Regression analysis found that the completion gap between students with and without disabilities is statistically equal to zero. This implies that the college completion gap by high school disability status is largely attributable to differences between students with and without disabilities in other traits that are known to affect completion—in-school behavioral and academic traits and particularly the timing of initial college enrollment after high school graduation (immediate or delayed) and the sector (public or private) and level (2-year or 4-year) of the starting college. SDP students from this cohort with disabilities were much more likely than those without disabilities to enroll in a community college (56% versus 39%) and to delay college enrollment after high school (56% versus 34%). After statistically controlling for these attributes, the independent (regression-adjusted) effect of disability status on completion was statistically equal to zero.

Non-Academic Behavioral Traits

The two non-academic traits—attendance and suspension in high school—that were closely associated with freshman year retention of this cohort of college-enrolled SDP graduates

are also closely related to their likelihood of completing college. Only 15 percent of college enrolled students whose high school attendance rates were in the lowest quartile (below the 25th percentile) of the attendance rates of all high school graduates had completed college with a credential or were still enrolled in college in April of 2014. The likelihood of completion steadily increased among students in successively higher attendance quartiles; 25% in the second lowest quartile, 37% in the second highest quartile, and 53% in the highest attendance rate quartile.

Even after statistically controlling for demographic, socioeconomic, and academic traits, in-school suspension status, and sector and type of college and timing of enrollment, high school attendance was closely linked to a seemingly distant (from high school) outcome—college completion; a 1 percent point increase in attendance is expected to raise college completion by 7/10ths of a percentage point. Raising the attendance rate by 10 percentage points is expected to raise the college completion rate by 7 percentage points. This cohort of SDP high school graduates had a poor record of high school attendance. Their mean attendance rate was only 87 percent; leaving a lot of room for improvement in attendance which in turn could improve their college enrollment, persistence, and completion outcomes.

Suspension while in high school was a common occurrence among this cohort of high school graduates. More than four out of ten high school graduates had one or more disciplinary incidents that resulted in suspension during high school and almost all suspensions were out-of-school suspensions. As noted in the previous section of this paper, students who were suspended during high school were less likely to persist through their first year in college. Negative behavioral traits that result in high school suspensions (especially out-of-school suspensions) appear to stay with the student through college, evident in their considerably lower college completion rates compared to students that did not have any suspensions in high school (23% among students with suspensions versus 43% among students without suspensions).

Regression findings, however, reveal that after controlling for other factors that are known to affect retention, the independent effect of high school suspensions was statistically equal to zero; that is, after statistically controlling for all other determinants of completion the logistic regression model found no independent effect of high school suspensions on college completion. Although this finding might appear anomalous, it is not very different from what we found in the analysis of freshman year retention among these students. Students with suspensions

were 21 percentage points less likely to return after their college freshman year than students without high school suspensions, but the regression model found only a 4 percentage point lower likelihood of college freshman year retention among students with suspensions compared to students without suspensions. Systematic differences between students with and without high school suspensions in other traits that are related to college persistence and graduation might underlie the much smaller independent (regression-adjusted) effect of suspension on these postsecondary outcomes than is found in descriptive (not regression-adjusted) analysis.

Academic Traits

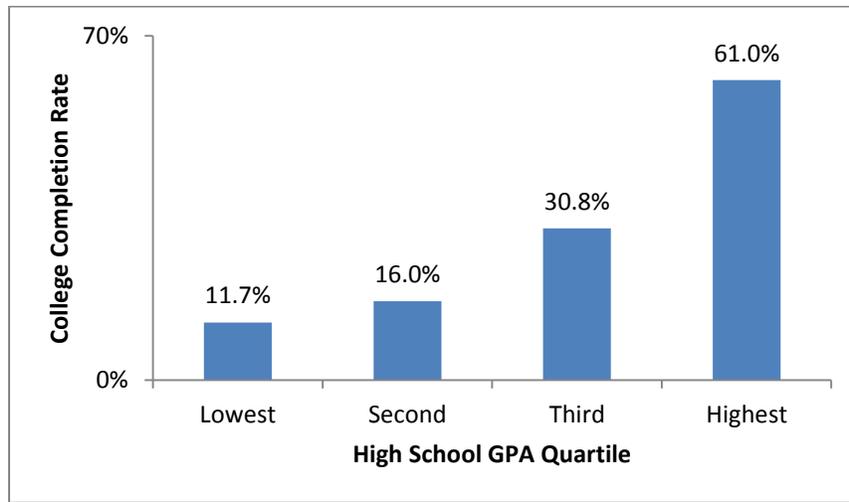
Students with stronger academic proficiencies are better prepared for the rigors of college level study. These students are more likely to enroll in college and persist through college and graduate with a college credential. Strong evidence of this connection is found in our analysis of the connections between college completion and high school GPA and standardized test scores (11th grade scores on reading and math PSSA tests). Students with lower grades in high school are not only less likely to enroll in college but when they do, these students are more likely than students with higher grades to struggle in college, placing them at a higher risk of not completing a program of study.

College completion increases sharply by high school GPA. College-going students from each of the four GPA quartiles of SDP graduates ranked by GPA had widely varying college completion rates: just 10 percent in the lowest quartile, 16 percent in the second quartile, 31 percent in the third, and 61 percent in the fourth and highest GPA quartile. College-enrolled students in the top high school GPA quartile were six times more likely to complete college with a credential than those from the lowest quartile.

Regression findings also estimate a sizable effect of high school GPA on college completion. After controlling for other determinants of college completion with logistic regression, high school GPA is found to have an almost one-to-one effect on college completion; for each additional point increase in high school GPA (out of 100 percentile points) the likelihood of college completion is expected to increase by 9/10ths of a percentage point. Converting the 100 point GPA percentile scale to a typical 4-point GPA scale, this finding means that a one point increase in GPA on a 4-point scale is expected to raise the likelihood of college completion by 22.5 percentage points. The mean GPA of high school graduates from this cohort

is 73 percent equivalent to 2.9 on a 4-point scale. Increasing the average to 3.4 is expected to increase college completion by 11 percentage points; moving from a high school GPA from a B-level to a B+ yields a very large gain in the chance of earning a college degree.

Chart 10:
Percent of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort who had Completed College or Were Still Enrolled in College as of April 2014, by High School GPA Quartile

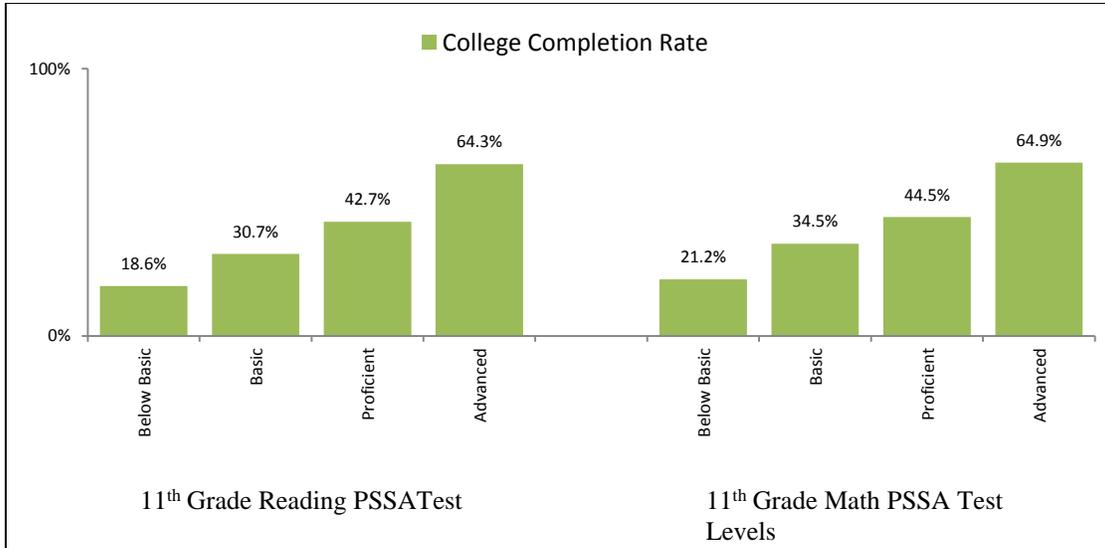


Since high school GPA is a measure of academic performance over the entire 4 years of high school and across a wide array of high school subject matter taught by a number of different teachers and classes, it is not only a strong measure of academic performance but also a proxy measure of a variety of traits such as consistency, perseverance, self-discipline, study skills and the like that are needed to consistently earn good grades over several years.⁵²

Academic skills measured by PSSA test scores are also closely related to college completion. College-enrolled SDP graduates with 11th grade PSSA test scores that were lower than the threshold that defines below basic proficiencies have a very low likelihood of completing college. About one-fifth of college-enrolled SDP students from the 2003-04 entering 9th grade cohort who had scored at the below basic level on reading and math PSSA tests had completed college with a credential or were still enrolled in college (19% among below basic reading scores and 21% among below basic math scores).

⁵² Geiser, Saul and Maria Veronica Santelices, "Validity of High-School Grades in Predicting Student Success Beyond the Freshman Year: High-School Record vs. Standardized Tests as Indicators of Four-Year College Outcomes," Research & Occasional Paper Series: CSHE.6.07, Center for Studies in Higher Education, University of California, Berkeley, 2007

Chart 11:
 Percent of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort who had Completed College or Were Still Enrolled in College as of April 2014, by 11th Grade PSSA Test Score Levels



Among those with better academic proficiencies as measured by higher PSSA scores, rates of college completion were higher. Students scoring at the advanced level had a college completion rate of 65 percent. These students are not only more likely to enroll in college, but when they do enroll they are more likely to succeed and persist through freshman year and all the way to graduation.

After the effects of other variables known to affect college completion (demographic, socioeconomic, behavioral, sector and type of college, and GPA) are statistically held constant (controlled) with logistic regression analysis, the connection between PSSA test performance and college completion is not nearly as strong as the descriptive analysis presented in the chart above suggests. A large part of the connection between PSSA test scores and completion is likely connected to the quality of the destination college. Students with high PSSA scores are more likely to be selective in their college choice and also more likely to choose a more selective (competitive) college. Selective colleges usually adopt a business model that is heavily focused on student retention and completion. Less selective and open-enrollment institutions are focused on student access and adopt a business model focused on ease of entry and finance, but that often lead to greater undergraduate attrition.

Table 18:
Regression-Adjusted* Percentage Point Effects of 11th Grade PSSA Test Score Levels
(relative to the reference group-Proficient level) on the Likelihood of College
Completion or Continuation among College-Enrolled SDP High School Graduates from
the Entering 2003-04 9th Grade Cohort

	Regression-adjusted* effect (on college completion/still enrolled) of student performance on 11th Grade PSSA tests	
PSSA Score Levels	Reading	Math
Advanced	+6.1 percentage points <i>higher</i> chance of completion compared to reference group	+4.5 percentage points <i>higher</i> chance of completion compared to reference group
Proficient	Reference group	
Basic	No difference compared to reference group	No statistical difference compared to reference group
Below Basic	-8.3 percentage points <i>lower</i> chance of completion compared to reference group	No statistical difference compared to reference group

*Note: Regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, timing, and Tri-State location of initial college enrollment.

Estimates of the independent effect of performance on the PSSA test (on college completion) in the regression model are measured as the strength of the relationship between completion of college-going students with below basic, basic, and advanced scores on the 11th grade PSSA test relative to students with proficient level scores on that test. This regression analysis of college completion found that college-going students with advanced level performance on the reading test were 6.1 percentage points more likely to complete college with a credential or continue to remain enrolled in college compared to those with a proficient level score on the 11th grade reading PSSA test. The regression-adjusted, college completion advantage of students with advanced level of performance on the PSSA math test compared to those with proficient level performance on the same test is 4.5 percentage points.

Poor performance (below basic level) on the reading PSSA test is estimated to have a negative independent effect on the likelihood of college completion. Students with below basic

level scores on the 11th grade reading PSSA test are 8 percentage points less likely to complete college than their classmates with a proficient level performance on that test.

Since academically proficient students are more likely to be prepared for college level work and therefore more likely to not only enroll but also persist in college through completion, it is not surprising to find the strong connection between the two measures of academic proficiency and the academic outcome of college completion. The effect of academic preparation and proficiency on college completion is also likely to mediate through both the choice of college and the timing of enrollment. This is because academically proficient students are more likely to seek admission immediately after high school at selective public and private institutions that have a strong focus on completion and where they are more likely to be with similarly prepared classmates.

Information from the National Student Clearinghouse on the name and or level of selectivity of the actual college of enrollment of these students was not available for this study. Consequently we were unable to identify variations in the quality and selectivity of the colleges in which students with different levels of academic preparation were enrolled.

The need to research this issue is critical given research findings on the difference between choice of colleges of high achieving students (such as those with advanced level performance on the PSSA test) from low income and high achieving students from high income families.⁵³ This research finds that high-achievers from low income families are less likely to apply to selective colleges. Sadly, they fail to apply even though they are academically qualified for admission at these institutions and could be awarded more generous financial aid. For high proficiency low income students these selective institutions where they would offer lower college costs compared to the less-selective or open enrollment institutions to which they often apply.

While many potential reasons could underlie this ‘under-matching’ in college choice of high-achieving students from low income families, lack of information is often identified as the key reason. And, interventions designed to improve information have resulted in increased applications to selective institutions among high-achieving low-income students. Better still,

⁵³ Hoxby, Caroline and Christopher Avery, “The Missing “One-Offs”: The Hidden Supply of High-Achieving Low Income Students,” National Bureau of Economic Research (NBER) Working Paper No. 18586, December 2012

when admitted to selective colleges these students were more likely to persist and complete their college education.⁵⁴ It would be beneficial to identify the colleges in which SDP graduates first enroll to determine if the choice of college is a proper match to student academic abilities. A mismatch between students and the colleges in which they are enrolled will increase the likelihood of changing colleges and increase the risk of dropping out.

Destination and Timing of College Enrollment: Level, Sector, and Timing of Initial College Enrollment

As noted in the discussion of freshman year retention in the previous section, the choice of college (public or private sector and two-year or four-year level) and the timing of initial college enrollment (enroll immediately after graduating high school or delay college enrollment) have a sizable impact on college freshman year retention. The connection between college choice (type of college and timing of initial enrollment) and college completion is also strong. Our examination reveals that decisions regarding the type of college and the timing of enrollment are critically important to completing college and earning a credential.

As noted in a prior section, 40 percent of the college-bound students from this 2003-04 9th grade cohort of SDP students had begun their college careers at a community college, 35 percent did so at a four-year public institution, and 23 percent started college at a four-year private institution. The likelihood of immediate enrollment in college (after graduating high school) varied by type of college. Overall 64 percent of those who had enrolled in college did so immediately after graduating high school; but the share of immediately enrolled students from this cohort varied widely by institution type; from 90 percent in four-year public institutions, to 60 percent in four-year private institutions, and only 47 percent in community colleges.

There was a sharp variation in the college completion rate by college type and timing of initial college enrollment. Students who had enrolled in college immediately after graduating high school were three times more likely to complete college than those who had delayed their initial college enrollment (46% versus 15%). The best completion outcome was among students

⁵⁴Hoxby, Caroline and Sarah Turner, "What High-Achieving Low-Income Students Know About College," National Bureau of Economic Research (NBER) Working Paper No. 20861, January 2015; Hoxby, Caroline and Sarah Turner, "Expanding College Opportunities for High-Achieving, Low Income Students," Stanford Institute for Economic Policy Research (SIEPR) Discussion Paper No. 12-014, March 2013; Avery, Christopher, "The Effects of College Counseling on High-Achieving, Low Income Students," National Bureau of Economic Research (NBER) Working Paper No. 16359, September 2010.

who had enrolled immediately after graduating high school in a four-year private institution. Over 65 percent of these students had either completed college with a degree or were still enrolled in college in April 2014. In marked contrast, the completion rate was only 18 percent among students who had also enrolled in a four-year private college but with a delay (after graduating high school).

Once again we find that SDP high school graduates who enroll in four-year private institutions have fundamentally different outcomes by the timing of their enrollment. Those who enroll in four-year private colleges immediately after graduating high school have the highest college completion rate while those who enroll at four-year private colleges with a gap between high school graduation and entry into college have among the lowest rate of college completion. The only students that performed worse on the college completion outcome measure were those who delayed college enrollment after graduating high school and went to a community college. There appears to be something fundamentally different about the four-year private colleges that are the destination of students who delay their college enrollment. Additional information about these colleges, especially four-year private colleges, is needed to explore this issue.

Among immediate (after high school) college starters who had enrolled in a four-year public college the completion rate was 53 percent; more than twice the rate of completion among those who began college in a four-year public institution with a delay after completing high school (24%).

Table 19:
Percent of College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort who had Completed College or Were Still Enrolled in College as of April 2014, by Sector, Level, and Timing of Initial Enrollment

Sector and Level of Starting College	Immediately Enrolled	Delayed Enrolled	All Enrolled
Two-year public	21.6%	9.0%	15.1%
Four-year public	52.9%	23.9%	50.1%
Four-year private	65.2%	18.8%	46.9%
Total	46.2%	14.6%	35.4%

Students who had enrolled in a community college with a delay after graduating high school were the least likely to complete college. Only 9 percent of this group had completed

college with a credential or were still enrolled in college. Those who started at a community college without waiting (immediately after high school) also had a low likelihood of completing college (22%), although they were twice as likely to complete college as their peers who had delayed their start at a community college (9%).

Findings from our logistic regression analysis reveal that even with regression controls of other variables that affect college completion, the independent (regression-adjusted) effect of the type of starting college and timing of initial college enrollment on the likelihood of completing college was sizable. Compared to students who had enrolled in a four-year private college immediately after graduating high school (reference group in the regression model), the regression-adjusted completion rates were considerably lower among their counterparts who had enrolled immediately or with a delay in two- or four-year public college as well as those who had enrolled with a delay in four-year private institutions.

Table 20:
Regression-Adjusted* Percentage Point Effects of the Level, Sector, and Timing of Initial Enrollment (relative to the reference group - four-year private, immediately enrolled) on the Likelihood of College Completion or Continuation among College-Enrolled SDP High School Graduates from the Entering 2003-04 9th Grade Cohort

Starting Institution and Timing	Regression-Adjusted* Percentage Point Effect on College Freshman Year Retention Rate (Relative to Students who Started College at Four-Year Private Colleges, Immediately)
Two-Year-Public, Immediately	-24.7
Two-Year-Public, Delayed	-38.9
Four-Year-Public, Immediately	-5.9
Four-Year-Public, Delayed	-20.4
Four-Year-Private, Delayed	-20.9
Four-Year Private, Immediately	<i>Reference Group</i>

*Note: Logistic regression controls include: gender, race-ethnicity, ELL, disability, free-subsidized school lunch in high school, student mobility in graduating high school, high school attendance rate and suspension, on-time high school graduation status, high school GPA, PSSA test score level, and the sector, level, timing, and Tri-State location of initial college enrollment.

Regression analysis finds that compared to immediately enrolled students in a four-year private institution, students who began their college education at a community college were 39

percent less likely to complete a college degree or certificate program of study if they delayed college enrollment and 25 percent less likely to complete if they enroll immediately after graduating high school.

Enrollment in a four-year public college, as well as delayed enrollment in a four-year private college, is also estimated to have a lower chance of completion relative to immediate enrollment in a four-year private college. The regression-adjusted completion rate of students who had delayed enrollment in a four-year public college or a four-year private college is expected to be 20-21 percentage points lower than the completion rate of immediately enrolled four-year private college students. The regression-adjusted completion rate was also estimated to be smaller (6 percentage points smaller) among immediately enrolled students in a four-year public college, compared to immediately enrolled students in a four-year private college.

College completion among college enrolled SDP high school graduates from the 2003-04 9th grade cohort was low. Only 35 percent of those who started college after graduating high school had either earned a college credential or were continuing their college education in April of 2014. However, analysis of factors that are known to determine college completion found a close connection between completion among this group of SDP high school graduates and their academic preparation, non-academic traits, particularly regular attendance in high school, their choice of college—level and sector—and timing of their enrollment in college.

Our analysis which relied upon rigorous statistical methods to disentangle the effects of different variables on completion and measures the independent effect of each variable, found little connection between college completion and immutable traits (race-ethnicity, gender, school lunch subsidy), but a strong connection between college completion and malleable factors such as academic preparation, attendance in high school, college choice, and timing of college enrollment.

These findings are quite encouraging insofar as they reveal that background traits that are immutable or at least hard to change are not very important factors in influencing the chance of SDP post-secondary outcomes. Instead, we find that there are a number of factors over which high schools have at least the potential ability to improve that are key determinants of post-secondary outcomes. However, too often the focus on problems of post-secondary retention and completion are focused on what the high school needs to do to improve outcomes. Our findings

clearly reveal that much of the wide variation in post-secondary retention and completion among SDP graduates is determined by the level and sector of the college in which they enroll. Two year public colleges and parts of the private four year college system are much more likely to lead to failure in college. Colleges and universities with low retention and completion rates can no longer simply point to high schools and say that students are not prepared for college. Instead our findings clearly reveal that they must begin a more serious process of self-scrutiny and identify the elements of their business and educational models that diminish the chance of success for otherwise able students.