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REGIONAL COLLEGE-GOING PATTERNS OF PHILADELPHIA PUBLIC HIGH SCHOOL GRADUATES: THE ROLE OF HIGH SCHOOL CURRICULUM

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Introduction

The Philadelphia Context

Obtaining a postsecondary education is increasingly critical for young people. With an increasing number of jobs requiring, at minimum, some postsecondary education, the economic and social disadvantages associated with lack of postsecondary education intensifying, and the number of students aspiring to postsecondary education growing (Callan, 2001; Education Trust, 2001; Heller, 2001; Labaree, 1997), getting students enrolled in college has become an increasingly important goal of educational systems.

As a result, college-going rates and patterns have become increasingly important indicators for use when considering the effectiveness of educational systems. In recognition of this, during the Spring of 2002, the School District of Philadelphia (SDP) and Temple University's Office of School and Community Partnerships partnered through the federal GEAR-UP program to develop a K-16 data-sharing consortium in the Philadelphia region. This partnership was initiated in order to examine the regional college-going patterns of Philadelphia public high school graduates and to provide a K-16 context for informing SDP's current efforts to improve secondary education.1

Increasing access to and participation in postsecondary education for the students that SDP serves (primarily minority and/or low-income students who have been historically underrepresented in the postsecondary arena) is an important goal of the District. This was the goal during the previous eras of reform (including the reform eras occurring during the years 1995-2001, the time period to which the data used in this study pertains), and has remained the case throughout the current reform efforts. In the last two years, these reform efforts have included: a reorganization of SDP leadership, achieved through a managed state takeover of the District; the hiring of private, non-profit, and university partners as educational management organizations; changes in the management and/or organizational structures of approximately 75 schools; the development of a new District-wide standardized curriculum for grades K-9; the implementation of a new District-wide standardized assessment system; and numerous other changes. More significantly for the analysis of college-going rates and patterns, these reform efforts have also included a renewed focus on reforming both the organization and the curriculum of SDP high schools. Significant capital commitments for the building of new high schools and improvements to existing high schools; plans to reorganize several existing high schools; the initiation of efforts to develop standardized secondary course offerings across high schools; new mandates to increase the number of Advanced Placement and International Baccalaureate courses across high schools; and the hiring of new counselors across high schools are all reforms that are relevant to a discussion of the college-going patterns of Philadelphia public high school graduates.

To inform these efforts to reform secondary education in Philadelphia and to understand their likely impact on regional college-going rates and patterns, it is helpful to first examine national college-going rates and the national demographic trends that impact them. It is also helpful to situate the discussion within the context of the ongoing national debate regarding the relative impact various factors have on college-going rates. These include factors that are internal to K-12 systems, such as academic preparation in secondary schools, as well as factors that are external to K-12 systems, including the socioeconomic pressures impacting students and families and the financial aid policies that alternately relieve and intensify these pressures. With this foundation, an analysis of the Philadelphia Regional K-16 Data-Sharing Consortium can more effectively answer the questions that this paper ultimately addresses: What are the relationships among various high school-level factors that influence college-going rates in Philadelphia? And, which of these high school-level factors most strongly influence regional college-going rates in Philadelphia?

College-Going Rates

College-going rates are an important measure for use by educational institutions and researchers. The California Postsecondary Education Commission, for example, states that college-going rates can play a critical role in evaluating educational systems, refining educational policy, and planning for future growth. They report,

> In addition to projecting enrollment demand, examining college-going rates can facilitate a better understanding of a

> wide variety of educational matters when considered in conjunction with other indicators. For instance, college-going rates, when examined along with other information, provide a basis by which education analysts, policy makers, and the public can make assessments about the institutional efficiency of our public schools, the effectiveness of student academic development programs, the significance of college awareness programs, the efficacy of admissions policies, and the accessibility of financial aid programs (CPEC, 1999, p. 6).

Increasingly, college-going rates are also recognized as one important indicator of the effectiveness of educational systems, both at the K-12 and the postsecondary level.

The National Center for Education Statistics reports that nationally 63.3% of 2000 high school completers enrolled in college the October after completing high school (NCES, 2002a). Some analysts, however, stress that college-going rates should be determined by considering the number of high school graduates who enroll in a postsecondary institution within a given number of years of high school graduation (often two) rather than those who enroll directly from high school. Nationally, it is estimated that 75% of high school graduates currently meet this criteria (Choy, Horn, Nunez, & Chen, 2000; Education Trust, 1999; NCES, 1998), with that number expected to rise to 80% by 2006 (Education Trust, 1999).

Demographic Trends

Demographic trends provide an important frame for understanding college-going rates. One such trend that bears great relevance is the changing number of high school graduates over time. Heller (2001) describes this trend nationally: "In 1971, the United States had 2.9 million high school graduates; the number peaked at 3.2 million in 1977 with the tail end of the baby boom, then declined to a low of 2.5 million in 1994" (p. 12). Holsworth (2000) describes a similar trend for Pennsylvania, in which the number of high school graduates declined 31.6% between 1976 and 1999. On the other hand, the School District of Philadelphia experienced a slight increase in its number of graduates between 1990 and 2001 (School District of Philadelphia, 2003a).

Despite a shrinking national pool of college-eligible persons, the number of students enrolling in postsecondary education in the United States has increased significantly. Heller (2001) reports that the number of undergraduates in the United States grew steadily during the 1970's and 1980's and reached a peak of 12.4 million in 1991 before leveling off. He attributes these enrollment increases to a tremendous (156 percent) increase in the number of 'nontraditional' college attendees (students outside the cohort of 18- to 24-year olds) and to a less-dramatic (32 percent) increase in the enrollment of 18- to 24-year old students. In addition, college-bound students nationally are applying to more colleges than ever before (Astin, Oseguera, Sax, & Korn, 2002), thus increasing their options for postsecondary attendance. It seems that these trends are present in Pennsylvania, as well. While state-wide actual college enrollment numbers for Pennsylvania are not available, Holsworth (2000) reports that the percentage of Pennsylvania high school graduates who self-reported that they would be attending an IHE as a degree-seeking student increased steadily from 41.8% in 1976 to 71.8% in 1999. Prior to the existence of the Philadelphia Regional K-16 Data-Sharing Consortium, there existed no comprehensive data on the college-going rates of SDP graduates.

Furthermore, the number and proportion of non-White students in the United States enrolling in college has increased steadily. Evangelauf (1992), Heller (2001), and Perna (2001) all report a recent disproportionate increase in minority postsecondary enrollment. The enrollment growth of Hispanics, Blacks, Asian and Pacific Islanders, American Indians, and Alaskan Natives have all outpaced the enrollment growth of White students. Carnevale and Fry (2002) predict that this trend will continue, with the vast majority (approximately 80%) of growth in the college-eligible population between 2000 and 2015 expected to come from members of minority groups. Although White students still represent 71.4% of those enrolled in postsecondary institutions (NCES, 2002b), their share of the total postsecondary population is diminishing. While the number of minority students who are enrolling in postsecondary institutions and their proportional share of all postsecondary enrollment are growing, Evangelauf (1992) warns that these increases are primarily attributable to the overall growth of the United States' minority population; the college-going rates of Black and Hispanic students remained relatively stable during the 1980's. Differences in college-going trends based on income levels also exist. College-going rates of students from all income groups increased between 1970 and 1997. The gap between these rates for students from the lowest and highest income quartiles remained flat, however, at 32%, with 85 % of high school graduates from families earning more than $75,000 going to college, and only 53 % of graduates from families earning less than $25,000 doing so (Fitzgerald & Delaney, 2002). Students from low-income families are more likely to enroll in college now than they were 30 years ago, but they remain proportionally less likely to do so than their higher-income peers; this gap has not changed significantly.

Despite the declines in the number of high school graduates, the proportion of graduates enrolling in postsecondary education has increased dramatically over the past 30 years. Along with that rise, the racial composition of the United States' postsecondary student population has become increasingly diverse. Students from low-income groups are more likely than they were 30 years ago to enroll in college, but are still significantly less likely to do so than their higher-income peers. These national trends provide a backdrop for understanding the college-going patterns of Philadelphia public high school graduates. They also frame the way that researchers have investigated the causes and effects of changing college-going rates and

patterns.

Factors Influencing College-Going Rates

Burd (2002) reports in the January 25, 2002 edition of the Chronicle of Higher Education that "The question of which is the primary obstacle [to college participation]-money or preparation-has created a deep rift among researchers who have been studying federal higher-education policy for decades"(p. A18). This divide significantly marks the existing literature that explores the factors influencing college-going rates and patterns.

Financial aid policies. Many researchers focus their attention on the role that federal, state, and institutional financial aid policies play in shaping college-going rates and patterns. Through their analyses of these economic and policy trends, these researchers examine the impact of socioeconomic factors such as race, gender, social class, and family income on college-going rates and patterns. They posit that structural forces play a crucial role in determining low-SES students' access to college (or lack thereof.) Unfortunately, financial aid information for graduates of Philadelphia public high schools was unavailable for this study. Nevertheless, the existing research dealing with federal, state, and institutional financial aid policies provides an adequate, if imperfect, frame for contextualizing the socioeconomic variables included in this study - high schools' minority enrollment and percentages of students eligible for a free or reduced lunch. Callan (2001), Gladieux (2002), and Lee (2002) outline two dominant trends in federal policy over the last two decades. First, the primary form of federal aid made available to college-eligible students has shifted from need-based grants to loans. In addition, the real value of federal Pell Grants, long the bulwark of financial assistance for low-income students, has steadily decreased (Heller, 2001; Gladieux, 2002). Second, there has been a federal shift in emphasis from directly appropriating funds to help needy low-income students attend college towards providing tax credits and tax incentives to provide relief that helps 'academically deserving' (and predominantly middle- and upper-class) students more easily afford college. The 1997 enactment of the Hope Tax Credit, providing relief for the cost of the first two years of college tuition, and the Lifelong Learning Tax Credit, for tuition expense after the first two years, are examples of this shift (Gladieux, 2002).

In recent years, state aid to students has undergone similar shifts with similar results. State aid programs have moved both their focus and their dollars away from the need- and non-need-based grants towards awards based on merit (Heller, 2002, p. 65). This has impacted college-going patterns by rewarding and supporting those (usually middle- and upper-income) students already most likely to attend college to the disadvantage of students who are economically needy and/or from racial/ethnic groups that are historically underrepresented in the postsecondary arena.

Furthermore, McPherson and Shapiro (2002) argue that "colleges and universities have also shifted their practices in providing student aid-both need-based and merit-based-to target more benefits to middle- and upper-income students"(p.73). As Gose (1998) reports, even urban institutions that have historically served the largely low-income, working class, minority populations in which they are embedded have altered their recruitment and admissions patterns. Institutions such as Temple University (the primary four-year destination for School District of Philadelphia students, according to the Philadelphia Regional K-16 Data-Sharing Consortium) are intensifying efforts to "woo" middle-class, suburban students who "are better prepared academically and come from wealthier families than city students" (Gose, 1998, p. A61). These trends in institutional, state, and federal aid policy have occurred in combination with a changing national economy and rising postsecondary tuition rates. The result has been seen in the costs of both tuition and college attendance as percentages of total family income rising markedly over the last three decades, with the greatest burden being felt by low-income students (Heller, 2001). The impact of these policy trends has been to significantly shift the objective of federal student aid from increasing access to postsecondary education for low-income students to increasing the affordability of postsecondary education for middle class students (Lee, 2002). Researchers focusing on the roles that federal, state, and institutional financial aid policies have on college-going rates and patterns argue that socioeconomics, particularly family income level, play a critical role in determining access to postsecondary education.

Academic preparation. The persistence of low-income students' comparatively low college-going rates is one of the most troubling-and most researched-facets of higher education (Burd, 2002). While some researchers focus on socioeconomic factors and structural forces when explaining this phenomenon, others focus on factors that are internal to K-12 educational systems. Of particular interest to many such researchers is students' academic preparation while in high school.

The National Center for Educational Statistics is a primary proponent of this alternative explanation for trends in national college-going rates and patterns. NCES (1998a) analyzed data from the National Education Longitudinal Study of 1988 (NELS:88) to examine access to postsecondary education of 1992 high school graduates by 1994, two years after high school graduation. They reported,

> High school graduates whose parents have low levels of income and education are able to attend four-year colleges at the same rates as students from middle-income families, if they do what four-year colleges expect them to do. That is, if low-income students have an academic record and aptitude test scores which demonstrate even the minimal qualifications for admission to a four-year institution, if they take a college entrance examination, and if they submit an

> application for admission, the majority of low-income students enroll in postsecondary education, and over 83 percent attend a four-year college or university (NCES, 1998a, p.1)

NCES (1998b) gauged academic preparation as an index of criteria that includes high school grade point average, class rank, standardized test scores, academic coursework, and completion of steps necessary for admission to a four-year institution (taking a college entrance examination and submitting an application.) Students were classified on a range from 'very highly qualified' to 'marginally or not qualified.' They reported the following relationship between this index and college-going rates:

> Among those seniors classified as marginally or not qualified for regular four-year college admission, half entered postsecondary education, but only 15 percent enrolled in a four-year college or university. Among those seniors who were minimally qualified, three-fourths enrolled in some postsecondary education and 35 percent attended a four-year institution. With each higher level of academic qualification, the total proportion of students enrolled in postsecondary education increases…56 percent of the somewhat qualified, 73 percent of the highly qualified, and 87 percent of the very highly qualified high school graduates enrolled in four-year institutions. (NCES, 1998b, p. 3)

In their analysis, academic preparation, as gauged by the index of criteria described above, impacted college-going (and four-year college-going) rates above and beyond other factors, including income levels. The clear suggestion is that factors related to academic preparation and achievement are more significant determinants of college-going than the structural factors described above. Indeed, NCES (1998c) reported "nearly two-thirds of the low-income 1992 high school graduates were enrolled in postsecondary education within two years of high school graduation despite the financial burden" (p.2).

In an analysis of earlier NELS data (for the graduating high school class of 1982), the College Board focused specifically on the impact that students' high school coursework had on their likelihood of attending college; this study found similar results. "When students are divided into groups according to their degree of participation in [high school mathematics, laboratory sciences, and foreign languages coursework], students who have taken more courses are more likely to go on to college than those students who have taken fewer courses" (College Board, 1990, p. 33). Their findings with regard to specific coursework are worth noting:

> Students who took one year or more of algebra were two to three-and-one-half times as likely to attend college as students who did not take algebra.
>
> Almost 82 percent of the students who took at least one year of geometry attended some college within four years of graduation, whereas only 41 percent of students without geometry went on to college.
>
> Students taking at least one year of laboratory science courses attended any college directly following high school at a rate of 65 percent, compared to a rate of 31 percent for students with less than one year of lab science.
>
> Students with two years or more of a foreign language were far more likely to…attend some college within four years of graduation [86 percent, compared to 44 percent of students with fewer foreign language courses.] (College Board, 1990, pp. 35-37)

Academic preparation significantly impacted college-going rates and patterns. Better-prepared, higher-achieving high school graduates were more likely than their worse-prepared, lower-achieving peers to participate in postsecondary education. Other researchers, including Ozden (1996), St. John (1991), and Adelman (1999) offer evidence that supports the conclusion that academic preparation and achievement have the most significant impact on students' college-going rates (and, some argue more importantly, their degree-completion rates).

In addition to academic preparation, researchers have also examined the impact of other factors that are more directly dependent on the internal workings of K-12 educational systems. The College Board (1990) found that students' postsecondary aspirations were closely related to their actual postsecondary paths. In the Board's analysis, more than 85 percent of students expecting to obtain a bachelor's degree attended college within four years of high school graduation, while only 40 percent of those who did not think they would obtain a bachelor's degree did so. Sophomores who intended to complete college were also five times as likely to proceed directly from high school to a four-year institution as their counterparts.

This paper's analysis wades into the literature's divide regarding the factors that most influence college-going rates and patterns. I employ a model for predicting college-going rates using high school-level predictor variables that gauge both socioeconomic factors and factors related to academic preparation. This model provides initial insight into the relative impact that these factors have on college-going rates. The results of this analysis suggest that academic preparation, constructed in this study as a high school's ability to successfully guide students through, at the least, a minimally rigorous high school strongly influences the likelihood that the high school will send its graduates on to regional postsecondary institutions. This is a significant finding given

the scope of the ongoing debate in the literature regarding the factors that most influence college-going rates and patterns.

This paper also contributes to the literature by focusing on a unique local environment. I provide a broad portrait of college-going patterns in a regional K-16 education system that includes a wide variety of postsecondary institutions and a large, urban school district that serves a high-minority, high-poverty, student body. The conclusions and policy implications that emerge should thus be of interest to educators and policymakers who have stakes in similar districts across the nation. These conclusions and policy implications should also be of great interest to those interested in the School District of Philadelphia. A thorough examination of college-going rates and patterns is important when attempting to frame, understand, and inform the current reform efforts underway in the School District of Philadelphia.

Research Methods

Data Collection

During the spring of 2002, the School District of Philadelphia (SDP) formally requested that approximately 60 area institutions of higher education (IHE's) report the numbers of SDP public high school graduates who applied to, were accepted by, and enrolled at their respective institutions as first-time, non-transfer freshmen in each year from 1995 through 2001. Each IHE was asked to provide this information for all of the 43 public high schools in SDP. All postsecondary application, acceptance, and enrollment data used in this study derives from this request. IHE's were selected for inclusion in the initial request based upon the following criteria: 1) informal conversations with SDP administrators and high school counselors indicated that SDP graduates applied to the IHE in significant numbers; 2) the IHE is in close geographical proximity to the City of Philadelphia; and/or 3) inclusion of the IHE helps to provide a representative sample of types of postsecondary institutions. Forty-six of the 60 IHE's from whom this request was made provided the requested information[2]. Of the 46, 21 provided the requested information for all seven specified years; 21 institutions provided the requested information for six of the seven specified years; two institutions provided the requested information for four of the seven specified years; one institution provided the requested information for three of the seven specified years; and one institution provided the requested information for one of the seven specified years.

These forty-six institutions do not represent the entire spectrum of postsecondary destinations for SDP graduates. The seven-year data set resulting from this request is accordingly not complete. The 46 participating regional colleges and universities do, however, represent a broad variety of institutional types, including public, private, state, state-related, and historically Black institutions, as well as two- and four-year institutions. Therefore, they provide a strong foundation from which policymakers and researchers can begin to understand the regional college-going patterns of Philadelphia public high school graduates and the contours of the Philadelphia-area K-16 educational system. As a more comprehensive listing of the actual institutions attended by SDP graduates becomes available, analysis of regional college-going rates and patterns can be enhanced by their inclusion, and the conclusions that are able to be drawn will have greater resonance.

Secondary data on Philadelphia high schools was collected from two sources. High school enrollment numbers, numbers of graduates by high school, and percentage of graduates from each high school self-reporting plans to enroll in a postsecondary education were all obtained from the Pennsylvania Department of Education (PDE) website for K-12 statistics (Pennsylvania Department of Education, 2003). This secondary data on high schools is available for 37 of the 43 high schools included in SDP's request to area IHE's. High schools' classification, racial composition, percentage of students eligible for free/reduced lunch, and percentage of June graduates enrolled in a college-preparatory curriculum are all made available to the public and to educational researchers by the School District of Philadelphia (2003b). This secondary data on high schools is available for 34 of the 43 high schools included in SDP's request to area IHE's. It is important to note that no individual student-level data has been collected from any source for this study. The unit of analysis for all data is the individual high school, and each variable is intended to measure school-level characteristics.

Independent Variables

The secondary data on Philadelphia high schools described above was used to construct six independent variables. They are:

1. **High School Classification**: Each high school was classified as either "Comprehensive," "Area Vocational & Technical," or "Special Admit." These three classifications are organized hierarchically, with Comprehensive high schools as a category being the least selective and Special Admit high schools as a category being the most selective. Comprehensive high schools are those that provide students from their immediate geographical vicinity with four years of academic and humanities course offerings. Area Vocational & Technical high schools are those that provide full-time students with four years of both academic and vocational/technical education and selectively admit students based in part on academic criteria. Special Admit high schools are those that have specialized programs (e.g., arts, international affairs, etc.) and have established admissions requirements, based at least in part on academic criteria, for accepting students (School District of Philadelphia, 2003c).

2. **High School Size**: This continuous independent variable was constructed as the average size of each individual high school's total enrollments in grades 9-12 over the years 1999-2001. High school enrollment numbers, taken each year as of October 1st, are reported by SDP to PDE on the Public School Enrollment Survey (PDE-4035).

3. **High School Minority Enrollment**: This continuous independent variable was constructed as each individual high school's percentage of non-White students enrolled in grades 9-12 at the end of the 2002 school year. "Minority," in this instance, is used to describe African-American, Black, Latino, Hispanic, and Asian students. 2002 minority enrollment information has been used as a proxy for "minority enrollment" over the years 1999-2001 because this information was not available for each year during this time span and because anecdotal evidence strongly indicates that there has been little change in most high schools' racial composition over this time period.

4. **High School Poverty**: This continuous independent variable was constructed as each individual high school's percentage of students enrolled in grades 9-12 at the end of the 2002 school year who were eligible for free or reduced lunch. In keeping with accepted educational research practice, "eligible for free/reduced lunch" is used as a proxy for poverty. 2002 high school poverty information has been used as a proxy for "high school poverty" over the years 1999-2001 because this information was not available for each year during this time span and because anecdotal evidence strongly indicates that there has been little change in the aggregate income levels of the most high schools' student bodies over this time period.

5. **High School Curriculum**: This continuous independent variable was constructed as each individual high school's percentage of June 1999 graduates who 'minimally' completed at least two years of college-preparatory math, science, and the same foreign language. This definition of a 'college-preparatory curriculum' was chosen for three reasons: 1) it reflects the minimum level of curricular rigor with which a high school student can maintain a reasonable expectation of postsecondary success; 2) it reflects a progression through a sequence of increasingly more challenging coursework in specific subjects; and 3) these courses reflect the current research consensus regarding 'gatekeeper' courses critical for postsecondary success (College Board, 1990; Adelman, 1999). While the data available for construction of this 'High School Curriculum' variable does not allow for a comprehensive measure of a school's curricular rigor, it does effectively gauge a high school's capacity for successfully guiding students through a curriculum that is reasonably likely to serve as a solid foundation for postsecondary success. 1999 high school curriculum information has been used as a proxy for high school curriculum information over the years 1999-2001 because information was not available for each year during this time span. Anecdotal evidence strongly indicates that there was little change in high schools' curriculum during this three-year period.

6. **College Aspirations**: This continuous independent variable was constructed as the percentage of each individual high school's June graduates in the years 1999-2001 who, on the yearly High School & Beyond Survey, self reported plans to enroll in a two- or four-year degree-granting college or university, or a specialized associate degree-granting institution. In keeping with accepted educational research practice, the results of the High School & Beyond Survey were chosen as the best indicator of graduates' postsecondary plans and expectations for themselves.

Dependent Variable

The secondary data on Philadelphia high schools was also used to construct the dependent variable used in this study, the preliminary three-year regional college-going rate. The preliminary three-year regional college-going rate of 36 high schools was determined by contrasting each high school's average yearly number of June graduates over the years 1999-2001 with each high school's average yearly number of graduates who enrolled in the Fall semester at any of the 46 consortium IHE's over the years 1999-2001.

Limitations of the Data

The dependent variable is referred to as the *preliminary three-year regional college-going rate* because there are some limitations associated with its calculation. It should be considered as a broad indicator, not as an exact rate. First, there is some lack of consistency in the enrollment numbers reported by Consortium IHE's[3]. Second, the use of high school-level, and not individual student-level, data is a defining characteristic of this study. As a result of this reliance on high-school level data, this study involves a relatively small number of cases: 43. This decision also makes calculating an exact college-going rate impossible, and impacts the conclusions that can be drawn from this data. For example, it is not possible to use this study to draw conclusions about how *students*' race/ethnicity, income level, or high school coursework impacts their likelihood of enrolling in an area postsecondary institution. It is, however, both possible and appropriate to use this study to draw conclusions about the influence that a *high school's* minority enrollment, poverty level, and course-taking patterns have on the college going rate of that school's graduates. Although the majority of the extant research on this matter deals with factors that impact individual students' enrollment rates, the high school-level data in this study should be of great interest and value to policymakers, educators, counselors, parents, and students alike.

In addition, the manner in which the independent variable High School Curriculum is constructed in this study should be carefully considered when drawing conclusions based on this study's analyses. Due to the lack of student-level data employed in this study and the author's limited access to SDP records, High School Curriculum cannot reasonably be considered as an encompassing measure of curricular rigor. Instead, it should be considered as a measure of high schools' ability to successfully guide students through, at the least, a minimally rigorous college preparatory curriculum, and conclusions should be drawn accordingly.

Analyses

My first stage of analysis was determining the ranges, means, standard deviations, and/or frequencies for each of the variables included in this study. Next, I determined the Pearson correlation coefficients between each independent variable and the dependent variable, and among the independent variables. This stage of analysis indicated statistically significant relationships between the dependent variable and all but one of the independent variables (high school size). It also indicated, however, a high degree of multicolinearity among the independent variables involved.

In order to determine the independent effects that each independent variable has on the preliminary three-year regional college-going rates, I then conducted an ordinary regression analysis. This stage of analysis provided insight into the explanatory power of the model I constructed. It also indicated significant predictive power for one independent variable (High School Curriculum), controlling for all other independent variables.

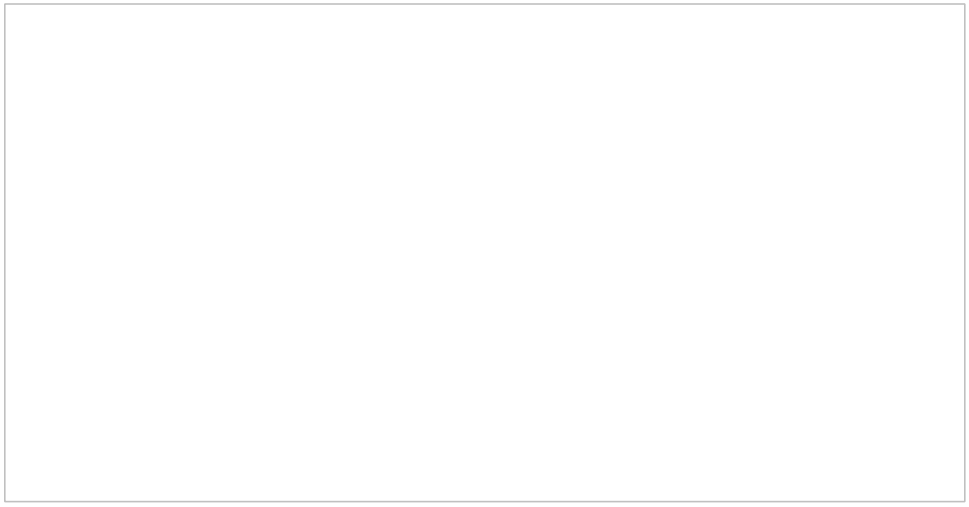
Due to the evident multicolinearity problem, I also sought to determine if the model would prove more efficient if I were to eliminate some independent variables based on their unique contributions to the model. I achieved this by conducting a backwards stepwise regression and assessing whether there was a significant change in the R- Squared values of the ever-more parsimonious models. By limiting the number of predictor variables in this stage of my analysis, I was able to account for somewhat less of the variance among high schools' preliminary three-year regional college-going rates, but I was able to lessen the multicolinearity problem described above, thus gaining additional insight into the relative predictive power of each of my independent variables.

Results

Table 1 displays descriptive statistics for the five continuous independent variables and one continuous dependent variable as well as a frequency count for the one ordinal independent variable used in this study. High schools range in size from 254 to 3346 students enrolled. High schools' percentage minority enrollment ranges from 34% to 100% and their percentages of students who are eligible for free or reduced lunch ranges from 39% to 86%. High schools' percentages of graduates completing a college-preparatory curriculum ranges from 0% to 100%, while their percentages of graduates who self-report plans to enroll in postsecondary education ranges from 20% to 96%. Clearly, there is a tremendous amount of variance among Philadelphia public high schools along each of these indicators. There is also noticeable variance among Philadelphia public high schools' preliminary three-year regional college-going rates. While the minimum case on this variable, 3.7%, is a low outlier and is missing other relevant information pertaining to the independent variables, there remains wide variance between the next lowest case, 17.1%, and the maximum case, 48.8%.

Table 1 *Descriptive Statistics*

(Click on the above link to display the table in a new window)

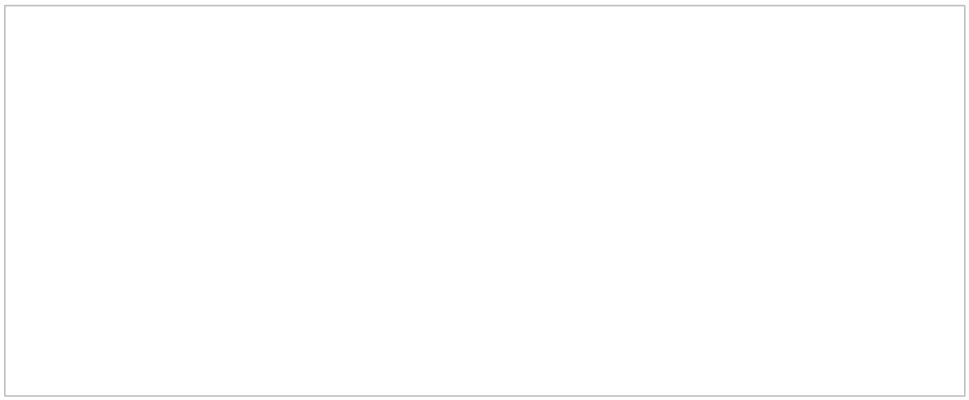


Additionally, many of these indicators have a strong impact on the dependent variable and/or are tightly intertwined with each other. Table 2 provides the answer to the first research question addressed by this paper, What are the relationships among various high school-level factors that influence college-going rates in Philadelphia? Table 2 shows the Pearson correlation coefficients among all six independent variables and between each independent variable and high schools' preliminary three-year regional college-going rate. Of the six independent variables employed in this study, all but High School Size are highly correlated with the dependent variable. As expected, High School Classification (.487), High School Curriculum (.750), and College Aspirations (.674) are all significantly positively correlated with high schools' preliminary three-year regional college-going rates, while High School Minority Enrollment (-.478) and High School Poverty Level (-.690) are both significantly negatively correlated with the dependent variable.

The multicolinearity present among the independent variables is also apparent at this stage of analysis. As expected, there are strong, statistically significant, positive correlations between High School Poverty Level and High School Minority Enrollment (.699) and between High School Curriculum and College Aspirations (.707). High School Classification is strongly positively correlated with both High School Curriculum (.501) and College Aspirations (.540); Special Admit and other selective high schools are more likely to have high percentages of their graduates at the least minimally academically prepared for and personally motivated for postsecondary education.

Perhaps most striking, though, are the extremely strong negative correlations between High School Poverty and High School Curriculum (-.734) and High School Poverty and College Aspirations (-.704). Those high schools with high percentages of their student bodies eligible for free or reduced lunch are very unlikely to have high percentages of their graduates at the least minimally academically prepared for and personally motivated for postsecondary education.

Table 2 Correlations
(Click on the above link to display the table in a new window)



*** Correlation is significant at the .001 level (2-tailed)
** Correlation is significant at the .01 level (2-tailed)
* Correlation is significant at the .05 level (2-tailed)

Taken together as an predictive model, the six independent variables employed in this study explain a great deal of the variance among high schools' preliminary three-year regional college-going rates. The R Squared for this six-variable model is .635, as Table 3 demonstrates. F-testing of this model indicates that it is a significant predictor with regard to the dependent variable when $p < .001$.

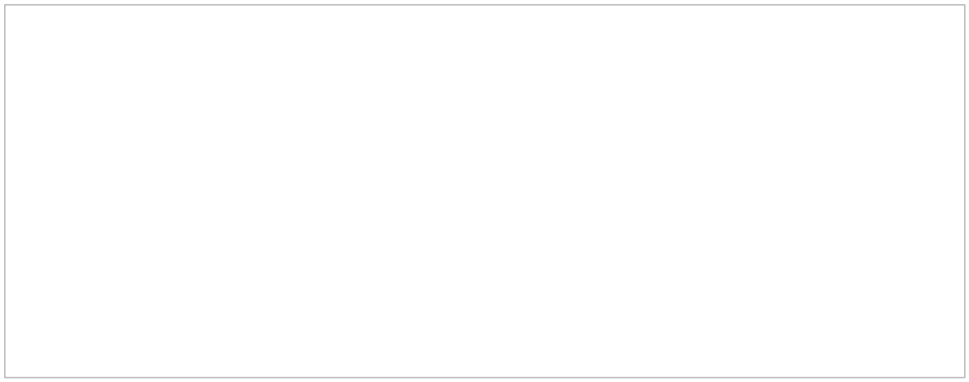
In order to determine the independent effects each predictor variable has on the dependent variable, I conducted an ordinary regression analysis, the results of which are reported in Table 4. This analysis establishes that of the six predictor variables employed in this model, the strongest-and only statistically significant-independent predictor of high schools' preliminary three-year regional college-going rates is High School Curriculum.

The Beta coefficient for this variable is .440, which is significant at $p < .05$. None of the other independent variables approached significance in this regression analysis.

Given the multicolinearity problems described above, I decided to also conduct a backwards stepwise regression, sequentially removing independent variables from this initial six-variable model based on their individual contributions. By creating ever-more parsimonious models and assessing the changes in the R-Squared of each successive model, I was able to simultaneously develop a more efficient predictive model given the limitations of the data. I was also able to gain further insight into the level of variance in the dependent variable for which High School Curriculum independently accounts. As Table 5 demonstrates, High School Curriculum does indeed seem to account for a significant proportion of this variance above and beyond the other independent variables.

As the original six-variable model is made increasingly sparse through successive removal of the least influential variables, the resulting models still explain the vast majority of the variance present in the dependent variable. By the time Model 4 is created, three independent variables remain: High School Classification, High School Poverty Level, and High School Curriculum. The R-Squared for this model is .624. The least influential of these three variables, High School Classification, is then removed to create Model 5. Model 5, which includes only High School Poverty Level and High School Curriculum, has an R-Squared of .605. The R-Squared change from Model 4 to Model 5 is not statistically significant. A more efficient model has been created, given what is known about the strong correlations between High School Classification and both High School Poverty Level and High School Curriculum.

Table 5. Stepwise Regression
(Click on the above link to display the table in a new window)



The next step in this regression is the removal of the less influential of the two remaining independent variables, High School Poverty Level. The resulting single-variable model, Model 6, has an R-Squared of .563. The R-Squared change from Model 5 to Model 6, while the most dramatic of any of the regression steps taken, is not statistically significant. Disentangling High School Poverty Level from High School Curriculum does not significantly impact the predictive power of the resulting single-variable model, providing further evidence that High School Curriculum does indeed account for the variance in high schools' preliminary three-year regional college-going rates above and beyond the other independent variables included in this study.

Discussion & Implications

Discussion

Of great interest to both local and national researchers and policymakers is the second research question addressed by this paper: which high school-level factors most strongly influence college-going rates in Philadelphia? The results of this paper suggest this response: High School Curriculum plays a critical role in determining the college-going rates of Philadelphia public high schools. Those high schools that are able to successfully guide a high percentage of their graduates through, at the least, a minimally rigorous college preparatory sequence, including two years of college-preparatory math, science, and the same foreign language, are likely to send a high percentage of their graduates to Philadelphia's regional institutions of higher education. The results of this study suggest that the impact of this High School Curriculum variable on high schools' preliminary three-year regional college-going rates is felt above and beyond the impact of other factors, including high school classification, high school size, high school minority enrollment, high school poverty level, and the college aspirations of high school graduates. Increasing students' access to and successful completion of a minimally rigorous curriculum at all high schools-including neighborhood comprehensive high schools that have high minority enrollments and high poverty levels-is likely to increase these students' access to and participation in regional postsecondary institutions as well.

This study's conclusions directly support the findings of other researchers. Choy et al. (2000), Adelman (1999), NCES(1998a, 1998b, 1998c), Adelman (1998), Ozden (1996), St. John (1991), and the College Board (1990) all make related arguments: measures of high school graduates' academic preparation and achievement, including high school curriculum completed, strongly influence college-going rates. The results of this paper should not, however, be taken as a refutation of the argument made by Heller (2001, 2002), Lee (2002), Callan (2001) and others that structural factors-such as the changing nature of federal, state, and institutional student financial aid-impact college access and college-going rates. Conceptualizing academic preparation and access to financial aid as mutually exclusive creates a false dichotomy that has dangerous policy implications. It would be counterintuitive to better prepare all students for college while removing the financial aid infrastructure that so often makes college attendance possible. Instead, efforts to maintain and build upon the United States' historical successes in making postsecondary education widely financially accessible should serve as a platform for efforts to make postsecondary education more widely academically accessible. Indeed, the best justification for a strong student financial aid infrastructure that supports all students' postsecondary attendance may well be a rising tide of students who are academically prepared to make the most of it.

Given the strengths of the data upon which these analyses are based and the various statistical angles from which they are evident, the conclusions drawn above are done so reasonably. Given the limitations inherent in the data and the fact that the independent variable High School Curriculum is not able to comprehensively operationalize and measure curricular rigor, however, alternate interpretations should be considered. For example, this study proposes a uni-directional relationship between a high school's ability to successfully guide students through, at the least, a minimally rigorous college preparatory curriculum and that school's likelihood of sending its graduates to regional colleges and universities. This interpretation should be tested in future studies.

Implications

This paper's conclusions also lend initial support to the School District of Philadelphia's current high school reform policies, which include a focus on making a more rigorous curriculum available to all high school students. The results of this study suggest that effective strategies for improving high schools' ability to successfully guide students through, at the least, a minimally rigorous college preparatory curriculum will result in regional postsecondary educational options becoming more widely accessible to all students. SDP's current efforts to improve curricular offerings, to ensure that all students are aware of and are placed into these rigorous courses, and to staff these courses with teachers who can help all students towards successful completion appear to qualify as such strategies. Future research and evaluation should test this. The outcomes of Philadelphia's efforts to improve access to both a college preparatory high school curriculum and postsecondary education will no doubt be of great interest to school districts across the country, particularly those that feed large urban K-16 systems.

These conclusions also have policy implications for the higher education side of the K-16 equation, both locally and nationally. These conclusions suggest that colleges and universities in the Philadelphia region can increase students' access to their institutions by working more closely with SDP to improve schools' ability to successfully guide students through a minimally rigorous college-preparatory curriculum. K-16 philosophy includes numerous strategies for postsecondary involvement in this effort, including: alignment of curriculum and assessment; improvement of teacher preparation efforts, so that more SDP teachers are prepared to teach rigorous curriculum to SDP students; and further integration into a regional K-16 system that facilitates a renewed focus on college-going for all students. When implemented thoroughly and carefully, these strategies have pointed towards increased college-going among all students in urban areas including New York City and El Paso, Texas. The responsibility for improving the college-going rates of Philadelphia public school graduates should by no means be considered the sole responsibility of the School District of Philadelphia.

Finally, this paper points to important directions for future research into college-going rates and patterns, both locally and nationally. In both instances, increased efforts should be made to more closely examine the links between students' secondary and postsecondary performance along a range of indicators. While this study points to a link between high schools' ability to successfully guide students through, at the least, a minimally rigorous college-preparatory curriculum and that school's likelihood of sending its graduates to regional colleges and universities, the High School Curriculum variable used in this study is imperfect. Efforts to more accurately operationalize and measure curricular rigor will be welcome additions that can test and provide substance to the findings of this study. For example, an analysis of the relationship between students' high school coursework and their performance on college placement exams will allow researchers and policymakers to more precisely examine, understand, and evaluate the effectiveness of educational systems across the K-16 spectrum. Additionally, a mixed-method study able to more accurately analyze the actual content and instruction in high schools and classrooms and their impact on college-going would be quite valuable. Throughout the future research, every effort should be made to consider the large group of students who are excluded from most studies involving college-going rates (including this one): high school non-completers. These students need to be included in our analyses of the factors influencing college-going rates and patterns if we are to truly use these measures to expand access to and participation in postsecondary education to all students. Ultimately, this should be the primary goal of both local and national researchers and policymakers who are analyzing college-going rates and patterns.

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APPENDIX I: PARTICIPATING IHE'S

Arcadia University
Bloomsburg University of Pennsylvania
California University of Pennsylvania
Cheyney University of Pennsylvania
Clarion University of Pennsylvania
Community College of Philadelphia
Drexel University
East Stroudsburg University of Pennsylvania
Edinboro University of Pennsylvania
Haverford College
Howard University
Indiana University of Pennsylvania
Kutztown University of Pennsylvania
La Salle University
Lincoln University
Lock Haven University of Pennsylvania
Mansfield University of Pennsylvania
Millersville University of Pennsylvania
Morgan State University
Neumann College
New York University
Penn State University (19 campuses)
Shippensburg University of Pennsylvania
Slippery Rock University of Pennsylvania
Temple University
University of the Arts
Villanova University
West Chester University of Pennsylvania

Notes

1 The author oversaw development of this partnership.back

2 See Appendix 1 for a complete listing of participating IHE'sback

3 In reporting the numbers of 'first-time, non-transfer freshmen,' consortium IHE's did not employ a single time frame for inclusion of students. That is, IHE's did one of two things: either reported on 'traditional college-aged students,' usually defined as students directly removed from high school or removed by two to five years from high school; or reported on students of all ages, indicating that the overwhelming majority (usually 85% or more) of their freshmen classes were of traditional college age.

As a result, it is not entirely clear how total is the overlap between those enrolling in consortium IHE's in the Fall semester of 1999-2001 and those who graduated from high school in the Spring of years prior to 1999-2001. The totality of this overlap is also affected by the construction of the formula used to calculate college-going rates; 1999 graduates have three years in which to enroll, while 2001 graduates have only one. Also, it should be noted that the enrollment data reported for the only two-year institution in the consortium includes both full- and part-time enrollees, while the enrollment data reported for all of the four-year institutions includes only full-time enrollments. back

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Benjamin Herold recently received his Master's Degree in Urban Education from Temple University in Philadelphia, Pennsylvania. For the past two years, he has served as the K-16 Coordinator for the Philadelphia GEAR-UP Partnership. During this time, he has overseen the creation of the Philadelphia Regional K-16 Data-Sharing Consortium and has worked to spread awareness of the importance of K-16 curricular and assessment alignment. Mr. Herold has also worked as qualitative researcher for the Temple University Young Scholars Program and in the field of gender violence as an organizer and trainer for the Institute for Safe Families and for Women Organized Against Rape, both in Philadelphia.

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