



Educational Opportunity in Indiana: Studies of the Twenty-first Century Scholars Program Using State Student Unit Record Data Systems¹

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¹ This report revise a report, "Education Opportunity: A Study of Indiana's Twenty-first Century Scholars Program," previously disseminated on a limited basis by the authors. This revised report corrects and updates analyses of the 1999 students cohort (Section 5) and revises the executive summary and conclusions based on the refined analysis.

Executive Summary

During the past two-decades, Indiana improved in both high school-graduation and college-enrollment rates compared to other states. The Twenty-first Century Scholars Program, a statewide project that guarantees student aid and provides support services to low-income students, along with state-wide efforts to provide college preparatory courses in all high schools appear to have contributed to these outcomes, but further research was needed given limited prior research on these programs.

The earlier studies of the Twenty-first Century Scholars Program established a significant positive association between completing the scholars pledge and enrollment in two- and four-year colleges. The more recent studies in this report substantially enhance the understanding of the direct and indirect effects of the Twenty-first Century Scholars Program. The studies reported here include:

- Analyses of academic preparation during high school using the 2000 Cohort and data from College Board surveys of high school courses along with student data from the Indiana Commission on Higher Education student information system (SIS).
- Analyses of student engagement in support services using the 2004 cohort comprised of data from records of student engagement in support activities provided by the Twenty-first Century Scholars program and regional centers along with data from the state student information system.
- Analyses of student aid applications using the 2005 cohort along with data from records of student engagement in support activities provided by the Twenty-first Century Scholars program and regional support centers along with information from financial aid applications.
- Analyses of degree attainment after six years of college using the 1999 cohort comprised of surveys of 9th grade students supplemented with information from the state student information system.

Academic Preparation: Studies of the 2000 Cohort

The linkages between policies—including high school reform policies and financial aid guarantees—and access to advanced curriculum have not been previously examined using a state-level database. Key findings from the analysis of access to advanced courses among students with financial need in Indiana's 2000 cohort² include:

² Analyses of preparation were limited to students who enrolled in college because: a) the College Board surveys were not completed by all students; and 2) SIS included information on diploma types only for students enrolled in college within the state system.

- Taking the Scholars Pledge improved the odds that students would complete the advanced preparatory curriculum (Honors diploma). This finding illustrates a consistent pattern that Scholars took advantage of access to advanced high school courses more often than their peers who did not take the pledge.
- Given high school reforms in Indiana, there was improved access to advanced curriculum in schools that serve a high percentage of minority students. Both students of color and white students enrolled in schools with a high percentage of minority students were more likely to complete Honors diplomas than students enrolled in schools with fewer minority students.
- Taking the Scholars Pledge was particularly beneficial to African Americans for whom taking the Pledge was positively associated with completing college preparatory curriculum (Core 40 and Honors diplomas) compared to the regular high school diploma.
- Taking the Scholars Pledge also improved access to advanced math courses (Calculus and Trigonometry/Pre-Calculus) among students who had enrolled in four-year colleges after taking the SAT as high school seniors.³ This finding indicates that the Scholars program improved preparation for STEM majors among students from families with financial need in the Indiana high school class of 2000.

Outreach and Encouragement: Studies of the 2004 Cohort

The analyses of encouragement activities provide substantial evidence of the linkage between engagement and academic preparation, a link in the academic success pipeline that has not been previously studied. Key findings include:

- Four patterns of engagement in support services converged as factors: student involvement in *counseling*, parent involvement in *academic preparation* activities; parent involvement in *events and college visits*; and parent involvement in college and career *planning* activities.
- Both student and family engagement along with affiliation with a regional service center improved the odds of enrollment among Scholars.
- Compared to other low-income students, taking the Scholars Pledge had a significant association with completing an Honors curriculum during high school, which can be explained in part by the positive association between engagement activities and preparation.

³ The outcomes for these analyses, enrollment in advanced math courses, were derived from the College Board surveys on the SAT. Since students enrolling in four-year colleges were more likely to complete the SAT than were students in two-year colleges, we limited these analyses to students who enrolled in four-year colleges.

- Taking a Scholars Pledge was positively associated with enrollment in four-year colleges compared to enrollment in two-year colleges, an outcome also positively associated with engagement in student support services.
- Students who used support serves provided by regional service centers were more likely than students who used only the statewide service to complete honors courses, to enroll in college and to enroll in a four-year college.

Application for Student Aid: Studies of the 2005 Cohort

Analysis of the relationship of engagement in outreach by students and parents with application for student aid, the key indicator of completing the Scholars pledge for students in the 2005 cohort, were: 1) parental involvement in events and site visits was positively associated with application for student aid; and 2) involvement in regional centers improved the odds of applying compared to only using the state center.

Degree Attainment after Six Years: Studies of the 1999 Cohort

Scholars in the 1999 cohort enrolled in public two- and four-year colleges at higher rates than non-scholars. Compared to their high school peers, Scholars attained four-year degrees at a slightly lower rate than other students, attained two-year degrees at a slightly higher rate, and a substantially higher percentage of Scholars attained some college, but dropped out before receiving a college degree. Overall, a higher percentage of Twenty-first Century Scholars who were in the 9th grade in 1996 eventually attained at least some college than did other students. However, the fact that the departure rate from college for Scholars in the 1999 cohort was higher than for other students is reason for concern. Multiple comparisons were conducted to discern reasons for departure. In analyses of Scholars compared to other students, Scholars had lower odds of attaining degrees than dropping out. However, when students who were eligible for or received Pell grants (i.e., students with similar financial and family backgrounds to Scholars) were the comparison group, Scholars had the same odds of attaining a degree.

Conclusions

Over time, substantial evidence is accumulating showing that the Twenty-first Century Scholars program is improving educational opportunity and college attainment in Indiana. For recent cohorts, there is evidence of improved access to college preparatory curriculum in high school and improved odds of enrollment in four-year colleges, especially research universities. It is expected that future cohorts will also enjoy better odds of degree attainment as a result of the program and the improved access to college preparatory curriculum for Indiana high school students in the early Twenty-first Century.

The Twenty-first Century Scholars Programs represents a model of success that has contributed to improved college enrollment rates in the State of Indiana. Additional investments in programs for college success have been made by the Lumina Foundation for Education and colleges and universities in the state. Future evaluation studies should focus on the impact of these new reforms on retention and degree attainment by low-income students.

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1.0 Educational Opportunity in Indiana

Improving educational attainment among citizens in the state has been a policy priority in Indiana for three decades. As part of the effort to adjust to a changing economy in the Great Lakes region, state policy has emphasized improvements in high school curriculum, student encouragement, and student financial aid as means for creating a nationally competitive workforce. Trends illustrate there has been substantial success.

The most notable improvement has been in college enrollment rates for high school graduates. Indiana ranked 8th in 2004 (Table A.1),⁴ with 62% of high school graduates enrolling compared to a national rate of 55.5%. This represents a substantial improvement compared to 1986 when only 33% of Indiana's high school graduates enrolled in college compared to 35.7% nationally, which ranked Indiana in the bottom quintile of states.

One aspect of the increase in college-going rates has been an improvement in high school curriculum. During the past three decades, the state has improved access to advanced courses while maintaining a competitive position in high school graduation rates (Table A.2). Indiana had a graduation rate of 76.2% for public high schools in 1986, a rate slightly higher than the national average of 73.4%. By 2004, Indiana's graduation rate of 62% compared to a national average of 55.5%. In spite of the decline in graduation rates in Indiana and the country overall during this period, the positive differential in graduation rates in Indiana compared to the nation improved from 2.8 percentage points in 1986 to 6.5 percentage points in 2004.

The state of Indiana requires all high schools to offer the Core 40 diploma (a college preparatory curriculum) and strongly encourages them to offer the additional advanced courses for completion of an Honors diploma. The state provides additional funding to schools per

⁴ Tables and figures whose labels start with an "A" are in the Appendix sections at the end of the report; other tables and figures appear at the end of each chapter or chapter section.

student completing a Core 40 or Honors diploma as an incentive for providing these opportunities to more students (Theobald, 2003). While Indiana has had college preparatory and Honors diploma options for some time, lower percentages of Indiana SAT takers had taken advanced courses, so it was important to provide incentives for schools to offer and encourage participation in advanced courses. The actual course requirements for the three diploma types—regular, Core 40, and Honors—are detailed in Table 1.1, along with the alignment of courses with college admissions.

Another aspect of the pattern of improved access in Indiana has been that outreach, encouragement, and support services available through the Indiana Career and Postsecondary Assistance Center (ICPAC) (Hossler & Schmit, 1995) have led a sustained statewide effort to provide information on education and career options to students in middle and high school. This process of outreach has doubtless contributed to the maintenance of relatively high completion rates in Indiana high schools as compared to the national average, given an environment of stiffening requirements for graduation.

Still another component of the Indiana story has been the sustained commitment to need-based student financial aid. In a period when many states—Georgia, Louisiana, Michigan, Florida and New Mexico—have shifted to merit aid as a priority, Indiana has risen among states in its investments in student aid. In 2004, Indiana ranked 3rd behind New York and California on investments in state grants as measured by the ratio of state spending per full time student on need-based grants to the weighted average tuition charge in the state (Figure A.1). State funding of need-based student financial aid has a strong positive association with college enrollment rates in time series studies of states (St. John, 2006; St. John, Chung, Musoba, Simmons, Wooden, &

Mendez, 2004). In fact, national trends in enrollment rates for high school graduates appear to rise and fall in a pattern consistent with this indicator of state investment in grants (Figure 1.1).

Indiana's Twenty-first Century Scholars Program has also contributed to the improvement in college enrollment rates in Indiana. Students who qualify for the federal Free and Reduced Lunch program in the 8th grade are eligible to sign up for this program, pledging to take the steps to prepare for college, remain drug and crime free, and apply for college and student financial aid. In return, the state of Indiana guarantees Scholars they will receive grants equaling tuition charges in a public college or university. This grant award, modestly higher than what a high-need student would receive otherwise, provides a guarantee for financial support that eases family concerns about college costs at an early stage in the student's academic career.

To build a research-based understanding of the ways the Twenty-first Century Scholars Program contributes to expanded educational opportunity in the state, it is important to consider the role of state policy in easing concerns about college costs, enabling preparation, expanding college choice, and enabling degree attainment. The balanced access model (Figure 1.2) provides a framework to guide research examining the impact of these policies. According to this model, there are eight different ways policy can influence educational opportunity; prior research has confirmed some of these linkages.

- *Easing family concerns about costs*: If low-income parents no longer fear that college costs will be prohibitive, they are more likely to encourage their children to take the steps to prepare for college (Linkage 1, Figure 1.2). The pledge process in the Twenty-first Century Scholars Program provides a mechanism for formalizing this link by committing grant funding as a response to the student's pledge.

- *High School policies that provide opportunities for preparation:* The state of Indiana requires all high schools to offer college preparatory curriculum (Core 40) and honors diplomas, and provides extra funds to high schools graduating students with these advanced diplomas. These policies have the potential to improve opportunities for low-income students to complete preparatory courses (Linkage 2).
- *Encouragement and outreach to improve preparation and college application rates:* Indiana provides information as support for all students and their parents and coordinates regional centers to encourage students to prepare and apply (Linkage 3).
- *State grants coordinated with tuition to make pricing more transparent and improve access:* Since Twenty-first Century Scholars are guaranteed grants equaling public college tuition, they are provided aid packages that are more likely to meet financial need and increase enrollment opportunity (Linkage 4), a link confirmed by prior research (St. John, E. P., Musoba, Simmons, & Chung, 2002).
- *State grants to improve the chances of enrolling in college:* Prior research confirms that Scholars awards improve the odds that low-income students will enroll in both two-year and four-year colleges compared to non-enrollment (Linkages 5 and 7) (St. John, E. P., Musoba, Simmons, & Chung, 2002; St. John, Musoba, Simmons, Chung, Schmit, & Peng, 2004).
- *State grants, college academic programs and student services to improve attainment:* Once admitted to college, Twenty-first Century Scholars benefit from

academic support and student aid like other students, and research indicates Scholars have the same odds of persisting through the first four years of college as non-Scholars (St. John, Gross, Musoba, & Chung, 2006) despite their low-income status.

While the contributions of the Twenty-first Century Scholars Program to improvements in college access, including the opportunity to enroll in four-year colleges, for low-income students in Indiana are well documented, many questions remain about the preparation process and patterns of college success. This report presents a new set of research studies that examine some of these remaining questions. Databases were developed and analyzed to examine:

- The roles of the Scholars Program and other state educational policies in improving academic preparation during high school (focus on linkages 1 and 3);
- The role of support services in college preparation (focus on linkage 2);
- Long-term patterns of academic success in college (focus on linkages 6 and 8).

Subject Area	General Diploma	College Prep. Dip.(Core 40)	Honors Diploma
English/ Language Arts	8 credits	8: Literature, Composition and Speech	8: Literature, Composition and Speech
Mathematics	4: Algebra I or Integrated Math I	6: Algebra I and II and Geometry	8: Algebra I and II, Geometry, and more advanced (e.g. Calculus, Trig., or AP Statistics)
Social Studies	4: US History, US Government, and other	6: US History, US Government, World History or Geography, Economics, and other	6: US History, US Government, and credits in World History, Geography, or Economics
Science	4: More than one area of science represented	6: Laboratory in Biology I, Chemistry I, Physics I or more advanced	6: Laboratory in Biology I, Chemistry I, Physics I or more advanced
Foreign Language		Can be part of the 8 "other areas"	6 -8 credits, must include 6 in one language or 4 each in two languages
Fine Arts		Can be part of the 8 "other areas"	2 credits Visual or Performing Arts
Other areas	2: Above subjects or technology competency	8: Either more courses in above subjects or computers or career/technical	
PE and Health & Safety	1: In each	1: In each	1: In each
Electives	16	2-4	9
Total Credit Hours	40	40	47
College Access	Eligible for regular admission at 2-year campuses, below requirements public 4-year campuses	Eligible for regular admission at a 4-year public campuses, recommended for 2-year campuses	Eligible for regular admission at a 4-year or 2-year public campus

Source: St. John & Musoba (in review).

Figure 1.1 National Trends in Continuation Rate and Grant/Tuition Ratio

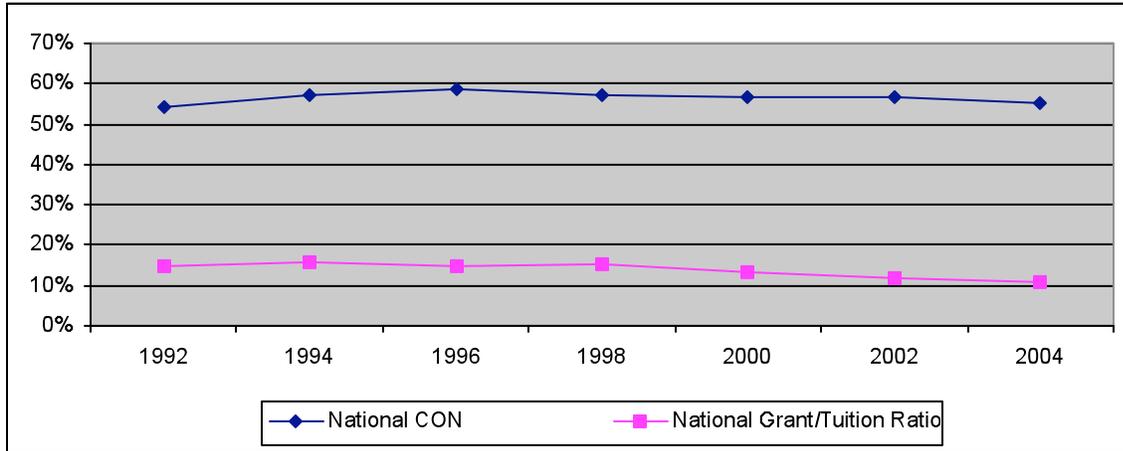
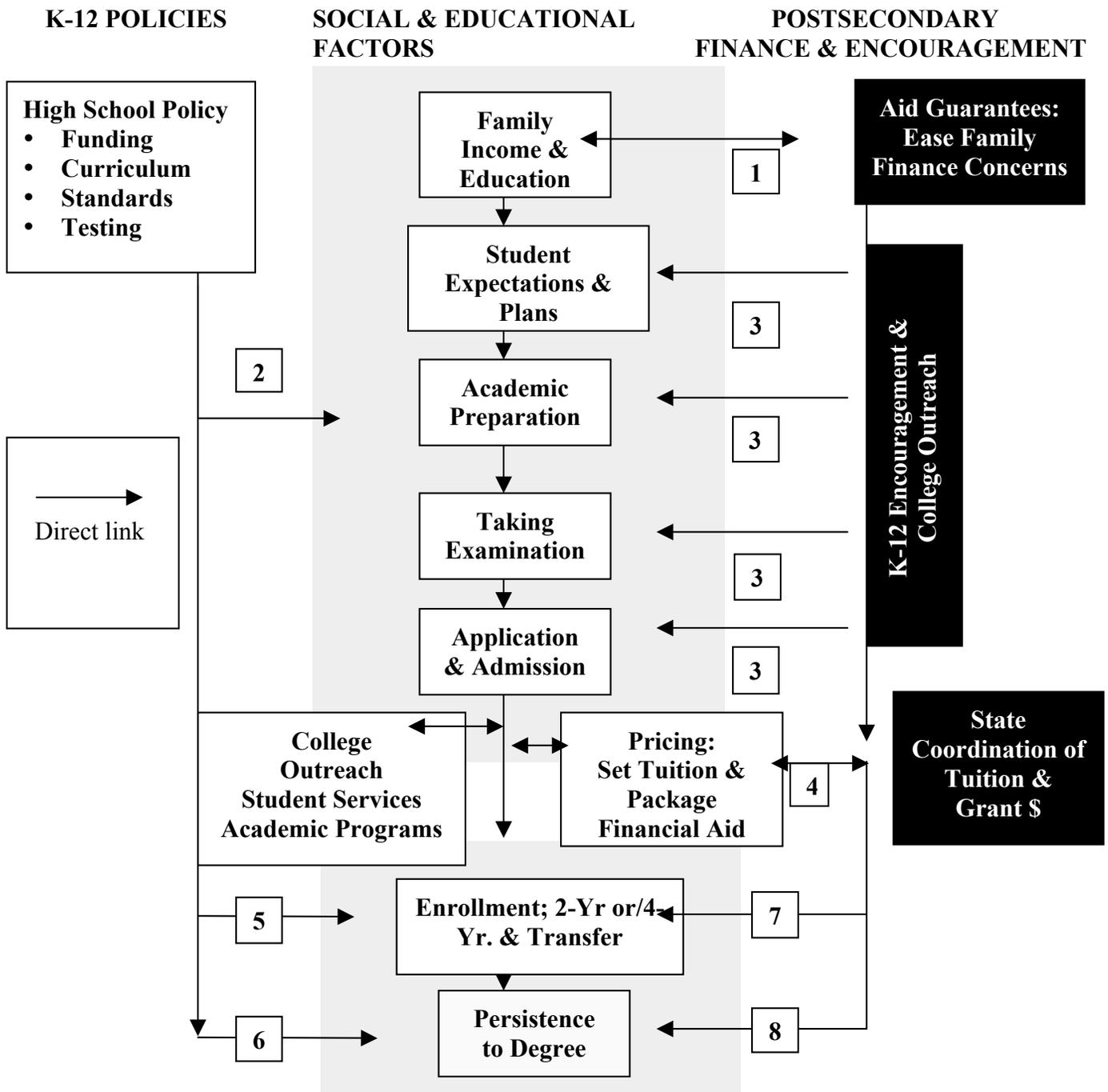


Figure 1.2 A Balanced Framework for Research on College Access and Success: Linking Public Policies and College Support to Preparation, College Choice, and Persistence



Source: Adapted Balanced Access Model from St. John, 2003

2.0 Academic Preparation: Studies of the 2000 Cohort

The ways education programs influence academic preparation (e.g., the role of state reform policies) have seldom been examined. The 2000 cohort of Indiana high school graduates dataset combines the students' questionnaires from the College Board, completed as part of the SAT, with records from the state student information system. Using this database it was possible to examine how both taking the Scholars' pledge (i.e., easing family concerns about college costs) and school characteristics (i.e., indicators for implementation of education reform policies) influenced academic preparation, controlling for family background. We considered two indicators of preparation:

- Completion of an honors diploma or a core 40 diploma compared to a regular diploma; and
- Completion of calculus or trigonometry/pre-calculus compared to completion of lower math standards.

The first of these analyses focus specifically on the diploma type and relate directly to the policy intent of increasing the percentage of students with preparatory curriculum. These analyses compare 21st Century Scholars enrolled in college with a similar group of Pell recipients (a federal need-based aid program) from the 2000 cohort. The second set of analyses uses only students in the two groups (Scholars and comparison students) who completed the SAT, the group for which we had specific course information.⁵ The two sets of analyses are presented after discussing the research approach.

⁵ Students reported whether they had completed or were taking specific courses as part of their response on the College Board questionnaire taken with the SAT.

2.1 Approach

The analyses consider the relationship between participating in the Twenty-first Century Scholars program and the type of diploma earned. This sample (n=5397) is restricted to the following population: (1) ages 17-19, (2) high school graduates, (3) either Twenty-first Century Scholar (treatment group) or other Pell eligible students (control group), and (4) Indiana state residents. The analysis is based on a parsimonious multinomial logistic regression where controls are included for student background (gender and race), parent characteristics (income and education), and school characteristics (locale, percent minority and percent free and reduced lunch). This analysis looks specifically at the traditional high school graduate who goes immediately to college.

Pell recipients who enrolled in college provided a group of Indiana residents with comparable socioeconomic status (SES) to the Twenty-first Century Scholars who also enrolled (Table 2.1). A slightly lower percentage of scholars were from families with incomes below \$30,000 (53% of Scholars compared to 60% of other Pell recipients). However, a slightly lower percentage of the Scholars had parents with college degrees (38% of Scholars compared to 41% of other Pell recipients).

The two groups differed slightly with respect to their schools and steps in the preparation process. Higher percentages of Scholars were from high schools with high minority enrollment and high poverty rates. Not only did the comparison group go to higher SES schools, but a higher percentage of students in this group actually took the SAT, an indicator of preparation illustrated in Table 2.2. Research clearly indicates that completing advanced courses in high school is associated with higher SAT scores in Indiana as it is nationally (St. John & Musoba, in review). These statistics of school context and test taking illustrate that the Scholars program was successful at recruiting students from high risk, high poverty schools with high percentages of

minority students. In addition, a higher percentage of the Scholars were from urban schools, while a higher percentage of other Pell recipients were from suburbs and towns. All of these factors would suggest that Scholars faced more numerous barriers to strong academic preparation.

The breakdown of the sample population by diploma type (Table 2.2) indicates that 25% received Honors diplomas, 41% received Core 40 diplomas, and 33% received regular diplomas. There was substantial variation in diploma type by race: nearly half of the Asian American students received Honors diplomas while more than 40% of African American and Native American students received regular diplomas. There were also variations in diploma type based on student background and other factors (e.g., locale), but the differences were not as great as for race. Given these findings, we completed supplemental analyses of diploma type to explore whether there were differences in the effects of the program across racial groups.

A higher percentage of Scholars than other Pell recipients actually enrolled in public four-year colleges. Prior research indicates that this difference could be due to additional financial aid—and the aid guarantee—rather than to preparation (St. John, Musoba, Simmons, Chung, Schmit, & Chung, 2002), which leads to a central question for this study: Do students in schools that serve minority and low-income students have equal access to advanced preparation? This issue is one of the intermediate outcomes overlooked in prior research.

2.2 High School Diploma Type

Multinomial logistic regression analyses were conducted to examine the relationship between being a scholar and the type of diploma received (Table 2.3). The analyses were limited to students who enrolled in four-year colleges because the preparatory diploma type is not required for community college enrollment. The coding of variables included:

- Twenty-first Century Scholars were compared to non-Scholar, Pell eligible students,
- Males compared to females,
- African American, Hispanic, Asian American, Native American, other and non-reported compared to whites,
- Students with high family income (above \$70,000), low income (below \$30,000), and missing income were compared to middle income (between \$30,000 and \$70,000) students,
- Students with parents who had attended college, had less than a high school education, or had missing information on parent's education were compared to students whose parents had graduated from high school,
- High schools in cities and rural areas and those with missing information on high school locale were compared to high schools in towns and suburbs,
- Schools with high minority (above 11.4%) enrollment were compared to schools with fewer minority students,
- Schools with high poverty rates (15.4% of students qualify for free or reduced lunch) were compared to high schools with less poverty.

In this analysis, earning an Honors or a Core 40 diploma was compared to earning a regular diploma. The independent variables were entered in four steps to provide a means of examining how adding variables changed the statistical relationships. Scholars were compared to non-scholars in Model 1, gender and race/ethnicity were added in Model 2, SES variables were added in Model 3, and school characteristics in Model 4.

The analyses indicated a positive association between being a scholar and receiving an Honors diploma, compared to a regular diploma, in the final two analyses, Models 3 and 4, after

family SES was considered. However, being a Scholar had a significant and negative relationship with receiving a Core 40 diploma only in Model 2, when student characteristics were considered without SES. When school characteristics were controlled (Model 4), the scholars pledge was not significantly associated with the receipt of a Core 40 diploma, but was significantly associated with receipt of an Honors diploma compared to a regular diploma.

Both gender and race/ethnicity had significant relationships with access to advanced curriculum as approximated by the level of diploma received. Males were consistently less likely than females to receive either an Honors or Core 40 diploma relative to a regular diploma. In addition, Latino/a and African American students were less likely than whites to receive an Honors diploma; African American students were also less likely than white students to receive a Core 40 diploma. Asian American students were more likely than white students to receive an Honors diploma than a regular diploma, but did not differ significantly with respect to the Core 40 diploma. These findings illustrate that race continues to be an important indicator of access to advanced curricula among Indiana residents.

Socioeconomic status (SES) was also significantly associated with diploma type. Students from high- and low-income families were consistently less likely than students from middle-income families⁶ to have attained either type of advanced diploma. In addition, having a parent with a college education improved the odds of receiving either a college preparatory (Core 40) or Honors diploma in high school compared to the regular diploma. Parents' education had a linear relationship indicating that as parental education increases, so does the type of diploma students receive. Income, on the other hand, revealed a curvilinear relationship to access to advanced curriculum, meaning that both low income and high income students were more likely to complete an advanced diploma relative to the middle income group.

⁶ This finding indicates a curvilinear relationship, given the positive association of being from a middle-income family. It clearly illustrates a non-linear logit. Design set variable coding avoids the linear assumption (Hosmer & Lemeshow, 2000) typically made when income is analyzed.

Being in schools with higher concentrations of minority students improved the odds that low-income students would receive an Honors or Core 40 diploma compared to a regular diploma. This finding strongly implies that having educational policies that require high schools to offer advanced programs and providing monetary rewards to schools for students completing these degrees improved access.

Table 2.1 Comparison of Scholars and Non-Scholars (Other Pell Recipients Among Freshmen Indiana Residents)

	Not a Scholar	Scholar
<i>Composite Gender</i>		
Male	41.45	40.10
Female	58.55	59.90
<i>Composite Ethnicity</i>		
Native American	0.53	0.48
Asian American Pacific Islander	1.88	0.80
African American	12.63	24.78
Hispanic	2.70	5.77
White	76.07	64.55
Other	1.13	2.33
Missing	5.06	1.28
<i>Composite Student Income Level In 2000</i>		
Below \$30,000	60.10	52.85
Missing	0.12	0.00
\$70,000 and over	1.35	5.61
\$30,000-\$70,000	38.43	41.54
<i>Composite Parent Education</i>		
Middle/Jr. High school or Less	2.58	2.97
High school	52.00	51.00
College or beyond	41.18	37.85
Missing	4.24	8.18
<i>SAT Test taker</i>		
No	35.83	33.84
Yes	64.17	66.16
<i>College Destination</i>		
Community College	23.54	14.84
Four-year Public	68.39	78.19
Four-year Private	8.07	6.98
<i>Locale</i>		
City	24.60	42.10
Suburban and Town	41.42	35.93
Rural	26.29	18.77
Missing	7.69	3.21
<i>Percent minority students in school I= greater than 11.4%</i>		
Missing	7.98	6.09
Less than 11.4%	59.52	44.91
Greater than or Equal to 11.4%	32.51	49.00
<i>Percent free and reduced lunch</i>		
Missing	9.57	5.29
Less than 15.4%	44.80	31.52
Greater than or equal to 15.4%	45.64	63.19
<i>Total</i>	76.89%	23.11%

Table 2.2 Breakdown of Independent Variables by Diploma Type for Scholars and Comparison Group

	N	Honors Row %	Core 40 Row %	Regular Row %
<i>Composite Gender</i>				
Male	2220	21.13	41.22	37.66
Female	3177	28.49	41.14	30.37
<i>Composite Ethnicity</i>				
Native American	28	10.71	46.43	42.86
Asian American Pacific Islander	88	47.73	34.09	18.18
African American	833	12.85	44.90	42.26
Hispanic	184	16.30	52.72	30.98
White	3962	29.48	41.65	28.87
Other	76	30.26	39.47	30.26
Missing	226	0.44	12.39	87.17
<i>Composite Student Income Level In 2000</i>				
Below \$30,000	3153	21.38	40.79	37.84
Missing	5	20.00		80.00
\$70,000 and over	126	27.78	33.33	38.89
\$30,000-\$70,000	2113	31.42	42.31	26.27
<i>Composite Parent Education Level</i>				
Middle/Jr High school or Less	144	20.14	36.11	43.75
High school	2794	25.02	42.30	32.68
College or beyond	2181	28.43	41.91	29.67
Missing	278	9.35	26.62	64.03
<i>21st Century Scholar</i>				
Not a Scholar	4150	25.61	40.75	33.64
Scholar	1247	24.94	42.58	32.48
<i>SAT Test taker</i>				
Yes	3488	33.34	46.27	20.38
No	1909	7.36	36.20	56.44
<i>College Destination</i>				
Community College	1162	3.79	26.59	69.62
Four-year Public	3813	31.08	46.60	22.32
Four-year Private	422	34.36	32.23	33.41
<i>Locale</i>				
City	1546	22.06	44.76	33.18
Suburban and Town	2167	28.43	42.87	28.70
Rural	1325	29.74	41.06	29.21
Missing	359	6.41	15.88	77.72
<i>Percent minority students in school I= greater than 11.4%</i>				
Missing	407	6.14	20.09	68.68
Less than 11.4%	3030	30.10	45.20	24.70
Greater than or Equal to 11.4%	1960	24.01	41.46	34.53
<i>Percent free and reduced lunch</i>				
Missing	463	11.23	20.09	68.68
Less than 15.4%	2252	30.10	45.20	24.70
Greater than or equal to 15.4%	2682	24.01	41.46	34.53
<i>Total</i>	5397	25.46	41.17	33.37

Table 2.3 Odds Ratios from a Multinomial Regression Predicting Diploma Type (Regular Diploma and Missing as Comparison)

Part A Honors	Model 1	Model 2	Model 3	Model 4
Scholars Pledge	1.000	1.100	1.360 ***	1.370 ***
<i>Background Characteristics</i>				
Male		0.577 ***	0.554 ***	0.547 ***
Native American and Other		0.756	0.645	0.659
Asian		2.490 ***	2.740 ***	2.790 ***
Black		0.290 ***	0.297 ***	0.321 ***
Hispanic/Latino		0.550 ***	0.599 *	0.611 *
No race reported		0.005 ***	0.008 ***	0.008 ***
<i>Parent Characteristics</i>				
Below \$30,000			0.549 ***	0.55 ***
Above \$70,000			0.535 **	0.535 *
Income missing			0.532	0.539
Parents ed. Less than high school			0.771	0.756
Parents college education or above			1.300 ***	1.310 ***
Parents education missing			0.263 ***	0.262 ***
<i>School Characteristics</i>				
High school located in city				0.974
High school located in rural area				0.940
High school location missing				0.435 *
Greater than 11.4% Minority				1.013 ***
Greater than 15.4% Poverty				1.000
Part B Core 40	Model 1	Model 2	Model 3	Model 4
Scholars Pledge	1.080	0.866 *	1.010	1.030
<i>Background Characteristics</i>				
Male		0.801 ***	0.779 ***	0.767 ***
Native American and Other		0.913	0.764	0.782
Asian		1.270	1.300	1.300
Black		0.787 ***	0.72 ***	0.769 **
Hispanic/Latino		1.340 ~	1.370 ~	1.410
No race reported		0.103 ***	0.150 ***	0.153 ***
<i>Parent Characteristics</i>				
Below \$30,000			0.712 ***	0.714 ***
Above \$70,000			0.554 **	0.554 *
Income missing			0.320	0.323
Parents ed, less than high school			0.750	0.726 *
Parents college education or above			1.100	1.110
Parents education missing			0.385 ***	0.382 ***
<i>School Characteristics</i>				
High school located in city				1.130
High school located in rural area				0.897
High school location missing				0.784
Greater than 11.4% Minority				1.013 ***
Greater than 15.4% Poverty				1.004 *
N	5563	5563	5563	5563
LR (Chi2)	4.0300	529.280 ***	886.940 ***	936.65 ***
Pseudo-R2	0.0003	0.044	0.076	0.08

~ p<0.10, * p<0.05, **p<0.01, ***p<0.001

2.3 Race and Diploma Types

Since the descriptive and regression analyses indicate that both race and school characteristics play substantial roles in access to advanced curriculum, it is important to examine the difference in access to advanced diplomas separately for whites and African Americans, the two groups for which there was sufficient data for this type of breakdown. The analyses use models identical to the ones discussed above except that race/ethnicity variables were excluded because only one racial group was considered in each analysis.

In the analyses of African Americans (Table 2.4), being a Scholar had a significant and positive association with completing an Honors diploma in Models 1, 2 and 4. This illustrates that the Scholars Programs enabled students to overcome barriers by easing concerns about costs and/or through encouragement. The scholars program was not significantly associated with a Core 40 diploma for African Americans.

SES did not have as strong a relationship with diploma type for African Americans as it did for the sample population as a whole. Low-income students were less likely than middle-income students to receive either type of advanced diploma, but parents' education was not significant.

Finally, school characteristics had a significant relationship with access to advanced courses for African Americans as they did for the entire population. Being enrolled in a school with a high percentage of minority students increased the odds of receiving an Honors diploma or a Core 40 diploma, compared to a regular diploma, for African Americans.

There were some differences in the analysis of whites (Table 2.5) compared to both the entire population (Table 2.3) and African Americans (Table 2.4). First, being a Twenty-first Century Scholar was not significantly associated with receipt of an advanced diploma for whites, a finding that differs from the prior two analyses. Second, parents' education was positively

associated with completion of an Honors diploma, compared to a regular diploma, for whites but not for African Americans.

There were also some notable similarities. Low-income white students were less likely to gain access to advanced diplomas than their middle-income counterparts, a finding consistent with the analyses for African Americans. In addition, attending a school with a high percentage of minorities was positively associated with completion of Honors or Core 40 diplomas for whites as it was for African Americans and the population as a whole.

The finding that enrollment in schools with high percentages of minorities is beneficial with respect to access to advanced courses is particularly noteworthy. It illustrates that the benefits of the academic reforms have enabled both students of color and majority students to improve access to advanced curriculum. In Indiana, the process of reforming high school curriculum appears to have had an impact on access to advanced curricula for all students in schools with high percentages of low-income and minority students.

Table 2.4 Odds Ratios from Multinomial Regression Predicting Diploma Type (Regular Diploma and Missing as Comparison) African Americans Only

Part A Honors	Model 1		Model 2		Model 3		Model 4	
21 st Century Scholar	1.920	**	1.880	**	1.740		1.850	**
<i>Background Characteristics</i>								
Male			0.578	*	0.58	*	0.566	*
<i>Parent Characteristics</i>								
Below \$30,000					0.569	*	0.574	*
Above \$70,000					0.775		0.739	~
Parents ed. less than high school					0.559		0.579	
Parents college education or above					1.08		1.01	
<i>School Characteristics</i>								
High school located in city							1.25	
High school located in rural area							0.763	
Greater than 11.4% Minority							1.015	***
Greater than 15.4% Poverty							0.995	
Part B Core 40								
	Model 1		Model 2		Model 3		Model 4	
Scholars Pledge	1.270	*	1.260		1.230		1.280	
<i>Background Characteristics</i>								
Male			0.805		0.784		0.772	
<i>Parent Characteristics</i>								
Below \$30,000					0.637	*	0.63	*
Above \$70,000					0.338	~	0.317	~
Parents ed. less than high school					0.967		0.93	
Parents college education or above					1.08		1.12	~
<i>School Characteristics</i>								
High school located in city					0.42			
High school located in rural area							0.944	
Greater than 11.4% Minority							0.722	
Greater than 15.4% Poverty							1.009	***
							1.005	
N	833		833		833		833	
LR (Chi2)	8.78		14.47		79.22		79.22	
Pseudo-R2	0.0005		0.01		0.482		0.482	

~ p<0.10, * p<0.05, **p<0.01, ***p<0.001

Table 2.5 Odds Ratios from Multinomial Regression Predicting Diploma Type (Regular Diploma and Missing as Comparison) Whites Only

Part A Honors	Model 1	Model 2	Model 3	Model 4
Scholars Pledge	1.120	1.130	1.140	1.130
<i>Background Characteristics</i>				
Male		0.571 ***	0.550 ***	0.542 ***
<i>Parent Characteristics</i>				
Below \$30,000			0.555 ***	0.554 ***
Above \$70,000			0.663	0.679
Parents ed. less than high school			0.689	0.697
Parents college education or above			1.270 **	1.280 ***
<i>School Characteristics</i>				
High school located in city				1.050 ~
High school located in rural area				0.963
Greater than 11.4% Minority				1.020 ***
Greater than 15.4% Poverty				1.004
Part B Core 40	Model 1	Model 2	Model 3	Model 4
Scholars Pledge	0.959	0.923	0.958	0.939
<i>Background Characteristics</i>				
Male		0.819 **	0.795 **	0.785 **
<i>Parent Characteristics</i>				
Below \$30,000			0.754 ***	0.753 ***
Above \$70,000			0.681	0.704
Parents ed. less than high school			0.746	0.715
Parents college education or above			1.120 ~	1.126
<i>School Characteristics</i>				
High school located in city				1.220 ~
High school located in rural area				0.946
Greater than 11.4% Minority				1.020 ***
Greater than 15.4% Poverty				1.003
N	3962	3962	3962	3962
LR (Chi2)	2.950	47.590	350.430 ***	387.420 ***
Pseudo-R2	0	0.005	0.041	0.045

~ p<0.10, * p<0.05, **p<0.01, ***p<0.001

2.4 Access to Advanced Math

The requirements for advanced diplomas (Table 1.1) do not explicitly include pre-Calculus or Calculus. Yet preparation in these subjects is a necessary standard for entry into four-year degree programs in science, technology, engineering, and math (STEM) fields. The standards for STEM preparation are higher than the standards for most other subjects, and the STEM fields are emphasized in the policy literature on workforce development (Commission on the Skills of the American Workforce, 2007). Prior research indicates that raising the number of math courses required for graduation is associated with increased access to advanced math courses (e.g., trigonometry/pre-calculus or calculus) for middle-income students but not for low-income students (St. John, 2006). Given this situation, it was important to consider the following question: Do the education and public finance policies in Indiana, including the Twenty-first Century Scholars program, influence preparation in advanced math for low-income students?

This analysis adapts the model to examine the influence of taking the Twenty-first Century Scholars pledge on improving access to advanced math among low-income college students enrolled in four-year colleges. These analyses were limited to students in the class of 2000 who took the SAT and enrolled in four-year colleges. The outcomes for the multinomial model were enrollment in calculus or enrollment in trigonometry/pre-calculus compared to enrollment in a lower level of math (Table 2.6).

First, taking the Scholars Pledge was positively associated with taking both Calculus and Trigonometry/Pre-Calculus compared to lower levels of math after student background was introduced into the equation. Specifically, when race was also considered, the scholars program had a positive association with access to advanced math. These analyses further confirm the critical role the scholars program plays for minority students in access to advanced course opportunities in Indiana.

Second, African American and Latino students were less likely than whites to enroll in Calculus compared to other math courses. African Americans were also less likely than whites to have access to trigonometry/pre-calculus than to lower levels of math. From the evidence, it appears that taking the Scholars Pledge helps students overcome this racial barrier, but not for all students. For example, Asian Americans were more likely than whites to enroll in both types of advanced math, a probable artifact of a cultural preference for STEM fields.⁷ Finally, males were more likely than females to enroll in calculus, another artifact of major choice given that males were more likely to choose engineering and other STEM majors (St. John & Musoba, in review).⁸

Third, low-income students had lower odds of enrolling in either calculus or trigonometry/pre-calculus compared to lower levels of math. Students whose parents had enrolled in college were more likely than students whose parents had graduated from high school to enroll in calculus than in lower levels of math. These findings further illustrate the role of social class, with income influencing access to advanced math and parents' education having an additional effect.

Fourth, school characteristics were also associated with access to math. Being in a high poverty school reduced the odds of enrolling in trigonometry/pre-calculus compared to lower levels of math. This indicates that the educational reforms in Indiana did not entirely overcome barriers to access to advanced math because a number of schools do not yet appear to offer the advanced courses in a sufficient number to overcome disparities.

⁷ Analyses of major choice among students in Indiana's 2000 cohort indicate that Asian Americans are more likely than whites to choose majors in STEM fields as freshmen (St. John & Musoba, in review).

⁸ African Americans were also more likely than whites to choose majors in STEM fields and computing (St. John & Musoba, in review), so we cannot attribute the lower rate of access to math to major choice for African Americans.

Table 2.6 Multinomial Regression Predicting Highest Level of Math Completed: Trigonometry/Pre-calculus compared to less math

	Model 1	Model 2		Model 3		Model 4	
Part A Trig/ Pre-Calc.							
Scholars Pledge	1.110	1.190	*	1.190	*	1.180	~
<i>Background Characteristics</i>							
Male		0.892		0.886		0.883	
Native American and Other		0.609	~	0.620	~	0.604	~
Asian		2.420	**	2.49	**	2.48	**
Black		0.618	***	0.645	***	0.666	**
Hispanic/Latino		0.868		0.903		0.894	
No race reported		0.000		0		0	
<i>Parent Characteristics</i>							
Below \$30,000				0.789	**	0.79	**
Above \$70,000				1.018		1.03	
Parents ed. less than high school				0.832		0.845	
Parents college education or above				1.03		1.03	
<i>School Characteristics</i>							
High school located in city						1.005	
High school located in rural area						0.950	
Greater than 11.4% Minority						1.004	
Greater than 15.4% of the class qualifies for free or reduced lunch						0.991	*
	Model 1	Model 2		Model 3		Model 4	
Part B Calculus							
Scholars Pledge	1.120	1.300	*	1.290	*	1.290	*
<i>Background Characteristics</i>							
Male		1.230	*	1.220	*	1.227	*
Native American and Other		0.760		0.758		0.763	
Asian		3.280	**	3.32	***	3.3	***
Black		0.326	***	0.339	***	0.328	***
Hispanic/Latino		0.315	**	0.359	**	0.358	**
No race reported		0.000		0		0	
<i>Parent Characteristics</i>							
Below \$30,000				0.736	**	0.735	**
Above \$70,000				1.05		1.05	
Parents ed. less than high school				0.687		0.682	
Parents college education or above				1.503	***	1.500	***
<i>School Characteristics</i>							
High school located in city						1.050	
High school located in rural area						1.050	
Greater than 11.4% Minority						0.998	
Greater than 15.4% of the class qualifies for free or reduced lunch						1.005	
N	3544	3544		3544		3544	
LR (Chi2)	2.06	105.350	***	143.17	***	153.54	***
Pseudo-R2	0.0003	0.015		0.0203		0.0218	

~ p<0.10, * p<0.05, **p<0.01, ***p<0.001

2.5 Summary Findings on Preparation

The linkages between policies—including high school reform policies and financial aid guarantees—and access to advanced curriculum have seldom been previously examined using a state-level database.⁹ Key findings from the analysis of access to advanced math courses among students with financial need in Indiana’s millennial cohort:

- Taking the Scholars Pledge improved the odds of completing advanced preparatory curriculum (Honors diploma). This finding illustrates a consistent pattern that Scholars had greater access to advanced high school courses than their peers who did not take the pledge.
- High school reforms in Indiana apparently improved access to advanced curriculum in schools that serve minority students. Students, both minority and white, enrolled in schools with high percentages of minority students were more likely to complete Core 40 or Honors diplomas than students enrolled in schools with fewer minority students, even though, as the point above illustrates, there is more work to do.
- Taking the Scholars Pledge was particularly beneficial to African Americans. Among African Americans who enrolled in college, taking the Pledge improved the odds of completing college preparatory curriculum (Core 40 or Honors diploma) compared to the regular high school diploma. The same was not true for white students.
- Taking the Scholars Pledge also improved access to advanced math courses (calculus and trigonometry/pre-calculus) among students who enrolled in four-

⁹ There has been some prior research examining these linkages with national databases (e.g., St. John, 2006), but we know of no prior state-level studies that have examined these linkages.

year colleges after taking the SAT. This finding indicates that the Scholars program—in combination with the adoption of the Core 40 and the provision of additional state support to fund implementation—improved preparation for STEM majors among students from families with financial need in the Indiana high school class of 2000.

3.0 Outreach and Encouragement: Studies of the 2004 Cohort

The Twenty-first Century Scholars program has a statewide network of service centers that provide counseling and other support services to students and their families.¹⁰ Since 2000, Indiana has collected information regarding the use of services provided by the regional and statewide support centers. The systematic collection of this information provided a means to examine patterns of use and predicted outcomes (Table 1.1, link 3). While there is an extensive literature on student engagement in outreach activities prior to college enrollment, most of these studies are qualitative (e.g., McDonough, 1997; Hossler, Schmit, & Vesper, 1998). Patterns of student engagement in outreach and encouragement activities provided by state agencies, like those provided by the Twenty-first Century Scholars Program, can, in theory, improve opportunities to prepare for and enroll in college. The Balanced Access and Success Model (Figure 1.2) provides the logic for assessing the relationship between student and parent engagement in these services and subsequent outcomes.

3.1 Approach

The analyses used data collected by the State Student Aid Commission of Indiana (SSACI) on engagement in support activities provided by the statewide center in Bloomington and regional centers located across Indiana. Each time a student engaged in a service activity, the contact was recorded. Given this method of collection, the frequency of contact by activity and center providing the service were the primary indicators of student-parent engagement. Appendix II provides the complete list of service activities. To develop this database it was necessary to:

¹⁰ Historically these services were provided by ICPAC, but they are now provided by the State Student Assistance Agency of Indiana as part of a federal grant (GEAR UP).

- Create cohort files from information collected on each student since events were recorded but not organized into student files.
- Develop frequency measures for each activity to provide a measure of the extent of engagement for each activity.

The factor analyses (Section 3.2) used the database for the 2004 cohort. Factor analysis provides a useful method of identifying unobservable relationships between observed events. It is a statistical technique that permits representation of a set of variables in terms of a smaller number of variables (Kim & Mueller, 1978). This method involves a linear transformation using correlations between the original variables. When the resultant variables, known as factors, are used as independent variables, they serve in two ways: making the regression model more parsimonious and including measures of otherwise unobservable constructs. Factor analysis is not an analytic tool on its own; rather it creates conceptual variables.

Data collected by SSACI included all of the support activities available to scholars and recorded each incidence of participation. After reshaping the dataset to create unique records for each student, two sets of variables for each activity were created: an indicator variable for whether or not a student partook of a particular support service, and a variable counting how many times a student engaged in such an activity. Descriptive information about each of the specific support services for the 2004 Cohort appears in Appendix AII, Tables AII.2 and AII.3.

Factor analysis requires the use of continuous variables, hence only count variables were included in the creation of the factors. Because the support activities could be related to each other conceptually in a variety of combinations, all count variables were entered into an exploratory factor analysis. The exploratory factor analysis yielded four potential factors based on both statistical and conceptual strength; the broader concepts presented by each factor reflect

access to social and cultural forms of capital. The next step, confirmatory factor analysis for each potential factor, indicated that each factor stood on its own. For a list of each factor, the variables contributing to it, and the factor loadings, see Table 3.1. In that table, the Cronbach's alpha serves as a measure of reliability. The numeric score, which can range from 0 to 1, represents "the mean of the correlations between all of the different possible splits of the scale into two halves" (Cohen, Cohen, West, & Aiken, 2002).

Of final note is the highly skewed distribution of each factor. In order to include these newly created variables in the regression models, they needed to be recoded into dichotomous variables. Each factor was divided into whether or not a student or parent participated in that factor, creating four dichotomous variables.

To assess the relationship between student engagement and college enrollment by Scholars it was necessary to link with the student engagement database of the Indiana Commission for Higher Education's State Student Information System (SIS) for 2004-05. Student inclusion in the database served as an indicator of student enrollment. Some students in the 2004 Scholars cohort enrolled in Indiana's public colleges and universities while others did not. However, we had no indicators of enrollment in private colleges or universities or of enrollment out of state for students in this cohort. Some students who did not enroll in state colleges and universities enrolled in private or out-of-state colleges while others did not enroll anywhere. Given this limitation, analyses do not provide information on enrollment in *college*, but only enrollment within the state's public colleges and universities.

The analyses of college choice and academic preparation used a subpopulation from the 2004 file of students enrolled in public colleges and universities. This included all students designated in the SIS as being Twenty-first Century Scholars along with students who received

Pell grants and were Indiana residents but not Scholars. The two populations were not exactly comparable on income or parents' education. In addition, the Pell recipients may have been eligible for the program but did not enroll, so the Scholars self-selected into the program. Thus, other Pell recipients formed an appropriate control group since they were from low-income families and were eligible for need-based aid, but the groups were not an exact match. The analyses of both college choice and academic preparation used multinomial logistic regression.

3.2 Patterns of Engagement

The factor analyses of involvement in student engagement activities for the 2000 cohort found four factors related to the frequency of student engagement activities between 2000 (8th grade) and 2004 (spring of senior year) for students in the 2004 cohort (Table 3.1). The factors were:

- *Student engagement in counseling services.* Frequency of involvement in career advising, academic advising, personal counseling, and other counseling services provided by regional centers converged with a Cronbach's Alpha of .623.
- *Parent involvement in academic preparation.* Frequencies for activities related to asking the right questions, high school curriculum (Core 40/Honors), SAT/ACT Workshops, and Study skills workshops converged with a Cronbach's Alpha of .925.
- *Parent involvement with events and visits.* Parent involvement with campus visits, general events, project specific events, and ISTEP workshops (the state exit exam) converged into a factor with a Cronbach's Alpha of .623.

- *Parent involvement in planning activities.* Frequency of parent involvement in study skills workshops, career workshops, and college preparation workshops converged with a Cronbach's Alpha of .756

These factors provide indicators of patterns of engagement by students and their parents that hold together conceptually. As you can see, the only student activities that converged were related to counseling. Students using these services had a perceived need for counseling they did not receive through the school or home and followed through on acquiring these services through their regional centers. Other student engagement activities did not converge into a factor. On the other hand, several parental activities converged. The academic preparation for parents factor represents parental engagement in activities that inform them about the expectations for their students relative to college preparation. Parent activities related to preparation indicate active parental involvement in building an understanding of college, a form of family academic capital. Finally, the parent activities related to planning for college (e.g., attending workshops) are also logically aligned.

Table 3.1 Factor Analysis of Engagement in Outreach Activities Between 2000 and 2004 for Twenty-first Century Scholars and Their Parents, Cohort Eligible for College in Fall 2004

Counseling (Student)	Cronbach's Alpha (reliability) = .623	
Variables in Factor	Factor Loading	Factor Score
Count of Career Advising (Student)	0.837	0.376
Count of Academic Advising (Student)	0.823	0.370
Count of Personal Counseling (Student)	0.778	0.350
Count of Other Counseling (Student)	0.489	0.220
Academic Preparation (Parent)	Cronbach's Alpha (reliability) = .925	
Variables in Factor	Factor Loading	Factor Score
Count of Right Questions Workshops (Parent)	0.932	0.284
Count of Core 40/Academic Honors Workshops (Parent)	0.912	0.278
Count of SAT/ACT Workshops (Parent)	0.910	0.277
Count of Study Skills/Time Management Workshops (Parent)	0.869	0.265
Events and Visits (Parent)	Cronbach's Alpha (reliability) = .623	
Variables in Factor	Factor Loading	Factor Score
Count of College Visits (Parent)	0.810	0.340
Count of General Events (Parent)	0.693	0.291
Count of Project Specific Events (Parent)	0.680	0.285
Count of Cultural Events (Parent)	0.628	0.263
Count of ISTEP Workshops (Parent)	0.625	0.262
Career Planning (Parent)	Cronbach's Alpha (reliability) = .756	
Variables in Factor	Factor Loading	Factor Score
Count of Study Skills Workshops (Parent)	0.846	0.404
Count of Career Workshops (Parent)	0.843	0.402
Count of College Prep Workshops (Parent)	0.818	0.391

3.3 Enrollment in Public Colleges

The analysis of enrollment captures the pipeline from high school to public colleges within Indiana's state system of education. (Since enrollments in private colleges and out-of-state colleges are not included in the comparison variable in the logistic regression analysis, these analyses should not be treated as enrollment per se.) The logical model for enrollment in public colleges considered the influence of support services on enrollment. Student background information, a requisite for a sound logical model of enrollment, was not included in the database.

The breakdown of engagement activities (Table 3.2) provides a comparison of Scholars who enrolled in Indiana public colleges compared to Scholars who did not enroll for the 2004 cohort. The enrolled students had significantly higher factor scores on counseling and parent visits and events than did those who did not enroll. In contrast, enrolled Scholars had significantly lower scores on parental engagement in academic preparation than did those who did not enroll. The scores for parent involvement in planning activities did not significantly differ for the two groups. There were no significant differences for enrollment versus non-enrollment for any of the centers. However, students who used only services from the state center in Bloomington were less likely to enroll than students who used services at any of the regional centers.

The logistic regression analysis of enrollment in public colleges (Table 3.3) indicates a strong relationship between engagement factors and college enrollment. The model correctly predicts 66% of the cases (which would include students who did not enroll in the public system). Three of the factors had a significant association with enrollment in the public system. Students with higher scores on the counseling factor and parent involvement in events had higher

odds of enrolling in college than did students with lower scores on these factors, indicating that using counseling services and engagement in parent activities are associated with continuation in the state system. One factor, parent engagement in academic preparation activities, was negatively associated with continuation in the public system. Since these activities are generally thought to be associated with enrollment, it is probable that this factor is associated with enrollment in private or out-of-state colleges. We could not test this alternative hypothesis with the data available.

In addition, students who engaged in regional service center activities were more likely than students who used only state services to enroll in college. This is a *prima facie* indicator that the regional service centers provided effective support for students. This hypothesis is further tested in the analysis of college choice below.

Table 3.2 Factor Scores for Engagement Activities and Service Center Site Use for Twenty-first Century Scholars in the 2004 Cohort: Breakdown Comparing Enrollment to Non Enrollment for Fall 2004 (N=5,668)

Activities	Enrollment Status ^a		
	Enrolled (Mean)	Not Enrolled (Mean)	Sig. Diff.
Counseling for the Student (Standardized Factor) ^b	0.03	-0.02	~
Academic Preparation for the Parent (Standardized Factor) ^c	-0.05	0.02	*
Visits and Events for the Parent (Standardized Factor) ^d	0.05	-0.03	**
Career Planning for the Parent (Standardized Factor) ^e	0.03	-0.01	

Support Sites ^f	Total (Count)	Enrolled (%)	Not Enrolled (%)
State Center (Bloomington) ©	694	24.64	75.36
Charlestown	254	37.01	62.99
East Chicago	442	32.81	67.19
Evansville	254	37.01	62.99
Fort Wayne	238	34.87	65.13
Gary	228	44.74	55.26
Indianapolis	567	38.10	61.90
Knox	145	35.17	64.83
Kokomo	243	40.33	59.67
Lafayette	202	37.13	62.87
Muncie	475	36.84	63.16
North Vernon	265	29.81	70.19
Richmond	383	26.37	73.63
South Bend	584	38.18	61.82
Terre Haute	302	31.46	68.54
Unknown ©	2	100.00	0.00
Vincennes	252	38.49	61.51
No Support Site - Student Did Not Engage in Activities	138	30.43	69.57

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ~ $p < 0.1$

a. Enrollment information comes from the SIS database, which contains data only for students who enrolled in Indiana's public institutions of higher education.

b. Continuous variable measuring frequency of personal counseling, academic advising, career advising, and other counseling. Mean = 0, SD = 1

c. Continuous variable measuring frequency of workshop attendance on the following topics: Core 40/Academic Honors, Right Questions, Study Skills/Time Management, and SAT/ACT. Mean = 0, SD = 1

d. Continuous variable measuring frequency of college visits, general events, cultural events, project specific events, and ISTEP workshops. Mean = 0, SD = 1

e. Continuous variable measuring frequency of workshops for study skills, career, and college preparation. Mean = 0, SD = 1

f. Dichotomous variables of participation at this support site or not, with the support site at Bloomington and Unknown support site as comparison

Table 3.3 Logistic Regression of 2004 Cohort of Twenty-first Century Scholars Examining Relationship Between Participation in Engagement Activities and Different Support Sites with Enrollment within Indiana Public Colleges and Universities^a (N = 5,668)

Activities:	Odds Ratio	Sig.
Counseling for the Student (Standardized Factor) ^b	1.206	***
Academic Preparation for the Parent (Standardized Factor) ^c	0.832	*
Visits and Events for the Parent (Standardized Factor) ^d	1.176	***
Career Planning for the Parent (Standardized Factor) ^e	1.019	
Support Sites^f		
Charlestown	2.341	***
East Chicago	1.975	***
Evansville	2.384	***
Fort Wayne	2.236	***
Gary	2.996	***
Indianapolis	2.496	***
Knox	1.509	*
Kokomo	2.422	***
Lafayette	2.354	***
Muncie	2.194	***
North Vernon	1.576	**
Richmond	1.963	**
South Bend	2.543	***
Terre Haute	1.541	**
Vincennes	1.764	**
No Support Site – Student Did Not Engage in Activities	0.259	***
Number of Cases	5668.000	
	121.696	
Model χ^2 (df)	(20)	***
Nagelkerke Pseudo R ²	0.029	
% Correctly Predicted	65.51	

Note: *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$, ~ $p < 0.1$

3.4 Comparison of Scholars and Other Pell Recipients

The breakdown analysis comparing students in the Scholars program with students who received Pell grants (Table 3.4) found there were significant differences between the two groups. Most of the students in the two groups were from the lowest two income categories, but a significantly higher percentage of the non-scholars were from the lowest two income groups (86% of scholars compared to 95% of other Pell recipients). In contrast, a higher percentage of Scholars than non-scholars were minority students. Significantly higher percentages of Scholars were African Americans, Hispanics and Native Americans, groups generally less represented in college, while a significantly higher percentage of non-scholars were white. Apparently, many low-income whites did not choose to enroll in the program in spite of eligibility.

These two groups are not exactly comparable. Some students who signed up for the scholars program may have had growth in family income after they signed up. It is possible that some families would have income growth after the 8th grade and even some Pell recipients were from high-income quartiles. The fact that whites were less likely to sign up for the program should be an area of concern; all low-income students may lack the financial resources and academic preparation needed for college.

A higher percentage of Scholars than non-scholars among this low-income population had completed Core 40 or Honors diplomas. In addition, a higher percentage of Scholars than non-scholars enrolled in research universities and other four-year colleges, while a higher percentage of non-scholars enrolled in two-year colleges. The question we consider in the logistic analyses is whether these outcomes are related to engagement in outreach and encouragement support services. To examine this relationship, we recoded the variables related to engagement. First, rather than use factor scores, an approach that would have excluded the

comparison group, we used dichotomous variables related to whether or not students had used counseling services and whether or not students' parents were involved in the activities included in the factors. In addition, we compared students who had been involved in service activities at any regional center to others in a dichotomous variable. Using this coding scheme it was possible to examine the significance of engagement in the differences across outcomes.