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Access to and success within high ability tracks in Title I schools:

The International Baccalaureate

A Thesis

Presented to

the Faculty of the Morgridge College of Education

University of Denver

In Partial Fulfillment

of the Requirements for the Degree

Master of Arts

by

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Title: Access to and success within high ability tracks in Title I schools: The International Baccalaureate

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ABSTRACT

With a growing number of low-income students in the United States, it is critical to address persistent gaps in educational attainment. This study examined the postsecondary enrollment rates of students in Title I schools offering high academic ability tracks such as the International Baccalaureate Diploma Programme (IBDP) and explored access to these high ability tracks. Results indicate that the IBDP is available to low-income and minority students in Title I schools, although their participation rates were much lower than the participation rates of the average Title I student body. Nevertheless, once students participate in the IBDP, race/ethnicity and income appear to have a limited effect on immediate postsecondary enrollment. Moreover, Black IBDP students enrolled in college at the highest rates, even after controlling for income. This findings in this study replicate some well-established findings in the education literature, and introduce new findings as well on a unique population of students.

TABLE OF CONTENTS

CHAPTER 1: INTRODUCTION	1
CHAPTER 2: METHOD	14
Instruments.....	14
Participants.....	16
Procedure	16
Analyses	17
CHAPTER 3: RESULTS	19
Research Question 1	19
Research Question 2	19
Research Question 3	20
Research Question 4	23
Research Question 5	26
DISCUSSION	33
Limitations	38
REFERENCES	40

LIST OF TABLES

Table 1. All variables at each level included in the multilevel logistic regression model	28
Table 2. Descriptive statistics for both outcome groups.....	29
Table 3. Coefficients from the final logistic multilevel model.....	30

LIST OF FIGURES

Figure 1. The multilevel modeling equation and a list of predictors/covariates used in this study.	18
Figure 2. The racial and economic demographics of students in Title I schools that offer the IBDP. Comparisons are made to the demographics of all Title I schools in America (NCES, 2013).....	20
Figure 3. A comparison of the racial and economic demographics of IBDP participants and the demographics of students who attend schools that offer the IBDP.....	21
Figure 4. College enrollment statistics by race/ethnicity and income for IBDP students in Title I schools in comparison to national statistics.	25
Figure 5. Immediate postsecondary enrollment by economic status.	26

CHAPTER 1: INTRODUCTION

Income and race are inextricably entwined with educational opportunities and academic achievement in the United States (Hochschild & Shen, 2014; Reardon, 2011; Wright, 1978). The court case *Brown v Board of Education* in 1954 overturned formal racial segregation laws in an effort to provide equal educational opportunities for all races, but informal barriers emerged in their absence (Donelan & Neal, 1994). Segregation is intentional and institutional; even with a supreme court mandate of integration, schools are more segregated now than they were in the 1970s (Orfield, Frankenberg, Ee, & Kuscera, 2014). The intersection of race and income provides the greatest barrier to opportunity and subsequent academic and professional achievement (Alexander, Entwisle, & Olson, 2014; Reardon, 2011). The purpose of this study was to investigate the accessibility of rigorous, high-quality educational opportunities for low-income and minority students in high-poverty schools, and their subsequent success in these programs.

Nationally, students from low-income families are less likely to attend college or persist in college once they attend (Roderick, Nagaoka, Coca, & Moeller, 2008). The relationship between income and education is so systemic that “mother’s highest level of education” is typically regarded as a reasonable proxy for income in academic research. Studies show that income is predictive of college choice: nearly 40% of students from the

top 0.1% income level in America attend an ivy league or elite college, while only 2% of students from the bottom 20% income bracket attend a top college. Put differently, a child born into the top 1% is seventy-seven times more likely to attend an ivy league institution than someone from the bottom 1% (Chetty et al., 2017). Given that nearly 50% of children are born into families in poverty, income is a clear barrier to educational achievement and subsequent wealth (Southern Education Foundation, 2013).

Reports show that states improperly allocate funding for high-poverty districts, resulting in school level disadvantages in addition to the inaccessibility of critical resources that low-income students already face at home. Teachers in high-poverty schools are often paid less and have less experience than those placed in wealthier schools in the same district (Heuer & Stullich, 2011). When a school has a large proportion of low-income students, it is designated as a Title I school. Title I schools receive federal funds to provide support for low-achieving students to help them meet state standards, known as targeted assistance programs (“Improving Basic Programs Operated by Local Educational Agencies (Title I, Part A),” 2015). Even though funds are allocated by the number of low-income students in a school, federal requirements state that they must be spent on low-performing students (Heuer & Stullich, 2011). If more than forty percent of the school is low-income, Title I funds can be allocated to schoolwide programs. More than half of all students in the United States are low-income and therefore eligible for free or reduced lunch (FRL); as a result, nearly fifty percent of all schools operate schoolwide Title I programs (Suits, Barba, & Dunn, 2015).

Although the intent of the allocation of Title I funds is to serve low-achieving students, schoolwide programs are not required to target low-achieving students (Dynarski & Kainz, 2015). Unfortunately, given the high percentage of low-income students, Title I funding is reduced to an additional \$558 - \$763 per low-income student. In addition, even with the additional federal funds, per student spending is still lower in high-poverty schools than in low-poverty schools (Heuer & Stullich, 2011). And the expenditures of Title I funds are widely distributed: principals report spending Title I funds on teacher professional development, after-school programs, classroom technology, family literacy, summer programs, extended schools days, and transportation, all of which have not been shown to improve student achievement individually (Dynarski & Kainz, 2015). Funding to increase student achievement is simply inadequate, and if the current administration's school choice vouchers are financed by Title I funds, public schools and students will see even less money (Turner, 2016).

Studies show that the personal and school level disadvantages that low-income and minority students face result in a large achievement gap. A report by the National Assessment of Education Progress showed that low-income fourth grade students are two grade levels behind their non-low-income students in reading (Dynarski & Kainz, 2015). Low-income students score lower on cognitive performance measures from toddler age through high school (Coley & Baker, 2013). Black, Hispanic, and low-income students score much lower on standardized tests than their higher income white peers (Reardon, Robinson, & Weathers, 2017). In addition, black and Hispanic families are more than twice as likely to be poor or low-income than white families (Povich, Roberts, & Mather,

2014). Consequentially, black and Hispanic students face a myriad of disadvantages given the intersectionality of their race and income. A recent study from Stanford found that racial segregation coupled with economic isolation in schools is the most powerful predictor of low academic achievement (Reardon et al., 2017).

The stigma of systematic racial bias runs deep, even within education: white teachers are less likely than black teachers to believe that their black students will succeed, which could become a self-fulfilling prophecy for black students (Gershenson, Holt, & Papageorgec, 2016). This trend has been consistent for decades: research from the University of Wisconsin-Madison and the University of Chicago in the 1970s offered evidence that black men received a substantially smaller return on their investment in education than white males, controlling for all relevant background characteristics (Wright, 1978). A revolutionary decades long longitudinal study published in 2014 came to the same conclusion: less than five percent of children from low income families in Baltimore moved to the high income bracket or obtained a college degree. And again, controlling for all relevant variables, whites were over two times as likely to be employed as blacks (Alexander et al., 2014).

Given the large academic achievement gap across race and income, it is prudent to find a way to capitalize on the federal Title I funding and maximize the benefit of these additional resources to help not just low-achieving students but minority and low-income students. Academic tracking and ability grouping is an avenue worth exploring, although it is prudent to simultaneously avoid economic and racial grouping (Rubin & Noguera, 2004). Ability grouping involves placing students into homogeneous clusters for

instruction based on their academic ability levels, and has been a popular practice in America.

There are several different types of ability grouping: between-class, within-class, cross-grade, and special grouping for gifted students. Additionally, students can be tracked by their potential and aspirations into vocational or academic tracks. Between-class grouping places students within the same grade into high, medium, and low ability groups. Within-class grouping creates small groups within the same classroom based on ability. Cross-grade grouping groups students by their ability regardless of academic grade, and special grouping isolates gifted students into their own group (Steenbergen-Hu, Makel, & Olszewski-Kubilius, 2016). A recent meta-analysis showed that between-class ability grouping had no effect on academic achievement, although within-class ability grouping had a small, positive, and significant effect on K-12 achievement across low, medium, and high ability groups (Steenbergen-Hu et al., 2016). Cross-grade ability grouping had similar results to the within-class ability grouping findings. Special grouping for gifted students had the strongest effect on academic achievement, indicating that gifted students benefitted from placement in a high achievement ability group. Results did indicate that the effect of grouping was strongest for high-ability and gifted students (Steenbergen-Hu et al., 2016).

Still, there are meaningful concerns about the impact of academic grouping on racial and economic segregation within schools, which is warranted given the large body of research that offers evidence of a significant achievement gap by race and income. Tracking critics cite similar findings to the flaws of high poverty schools: low-ability

academic clusters are often assigned to new or less capable teachers, have inferior instruction materials, and have a higher proportion of minority students. This racial segregation and lack of opportunities in low-ability classrooms often does not go unnoticed by students in the school; similarly, teacher expectations of students are more likely to be lower (Rubin & Noguera, 2004). The similarity of these findings across both ability grouping and racial/economic achievement gaps is striking.

However, there are also academically pragmatic and meaningful logistical reasons that tracking is implemented in schools. Teachers with a wide range of abilities in one classroom are faced with additional instructional challenges and may end up with struggling students feeling frustrated and advanced students feeling bored. Rubin and Noguera (2004) argue that within-class ability grouping can be an effective remedy, as can placing low achieving but high potential students in high ability groups. Those suggestions align with the findings and subsequent tracking recommendations from the meta-analysis referenced earlier (Steenbergen-Hu et al., 2016). Ability grouping can offer many advantages if implemented correctly as it allows teachers to target instruction to ability levels, but it is important to not ignore the social and practical consequences that come with grouping.

Once children are placed in a lower track group, it is excessively difficult for them to be promoted to a higher track group without the intervention of an adult advocating for their advancement (Rubin & Noguera, 2004). Given that low-income and minority students often come from single parents households with less engaged or highly educated parents, the odds of an intervention are further stacked against them (Coley &

Baker, 2013). One study showed that 70% of parents did not know that their child was in the lowest math track, but only 6% of parents did not know that their child was in the highest math track. Understanding that methods of support and encouragement may vary across race and income is critical to ensure that ability grouping is not simply a reflection of minority and economic status (Witenko, Mireles-Rios, & Rios, 2016).

Advanced Placement (AP) courses and the International Baccalaureate Diploma Program (IBDP) are two higher or gifted track programs offered in schools throughout the country (Park, Caine, & Wimmer, 2014). High marks on final examinations in these programs typically result in college credit, so it likely that students in these courses are on an academic track instead of a vocational track. However, the reception of college credit does come with a price: the cost of an AP examination is \$93, although low-income students are eligible for a \$31 fee reduction in addition to extra federal and state funds that will further reduce the burden to the student in most states (“Fees and Fee Reductions,” 2017). The fee structure for IBDP examinations is more complex; examinations cost \$126 with a substantial discount if a student takes all six examinations required to complete the IB Diploma. Students or schools are also responsible for one time examination registration fees, ranging from \$116 - \$168, with an additional \$141 for students who intend to complete the IB Diploma (“Assessment fees and services,” 2017). There is no examination discount for low-income students offered by the International Baccalaureate (IB). Unlike AP courses, which are based around examinations and individual subject-specific courses for high school students, the IBDP is a curriculum. IB schools are required to go through an authorization process, train their instructors to teach

IB courses, and pay an annual school fee. The AP and IBDP are typically categorized together because they both provide a pathway to a postsecondary education, but there are clearly many differences between the two (Park et al., 2014). Despite the costs associated with participation, it is worth mentioning that the exam fees are much cheaper than the cost of college credits they will supplement if students are successful. Given that college graduates are expected to earn one million dollars more than their high-school-diploma-only counterparts (Abel & Deitz, 2014), the investment seems justifiable.

The most recent figures from the CollegeBoard show that 27.5% of AP test-takers are low-income. Although this figure is much lower than the national average of low-income students (48% at the time of this report), it still represents a 400% increase in low-income test-takers from the previous decade. Data show that black students are underrepresented in both the AP test-taking population and the population of students who perform well on AP examinations, although white and Hispanic students are well represented in both categories. Asian students are overrepresented in both categories (CollegeBoard, 2014). The most recent comparable data for the IB comes from a study originally published in 2013 that uses data from 2009. Population level data shows that 17% of IB test-takers were low-income, 12% were Hispanic, and 9.5% were black; all statistics are much lower than the national average, although they also represent an increasing trend in diversity and availability over the previous years. The number of Title I schools offering the IB program increased dramatically as well (Halic, 2012; Perna et al., 2015). Although data show that low-income and black students are systematically

underrepresented in these higher-track or gifted ability groups, improvements in equality have been made.

The IB and AP are often compared because they are both rigorous academic programs that offer an opportunity for students to obtain college credit, however their tracking types are not identical. AP courses are typically designed to be taken at either the 11th or 12th grade level (CollegeBoard, 2013). Thus, AP courses would be generally classified as cross-grade ability grouping or special grouping for gifted students. The implementation of the IBDP varies across school districts and is not standardized: some schools implement the IBDP as a “whole school” curriculum which enrolls all students in IB courses, while others have different criteria for participation. The IBDP is specifically for students in grades 11 and 12, and IBDP courses are meant to span both years (International Baccalaureate, 2015a). Additionally, the IBDP has two types of courses: Standard Level (SL) and Higher Level (HL). HL courses are almost always implemented over both years, but it is common for SL courses to be implemented over one year as that fits the US credit system (Hertberg-Davis & Callahan, 2008). Therefore, IB courses could be classified as either between-group, cross-grade or special grouping dependent upon how the program is implemented within a school. If the IB is implemented as a “whole school” curriculum there would be no ability grouping component, although it is possible that charter or magnet schools could adopt the IBDP as a “whole school” curriculum, which could still be classified as between-group ability grouping (International Baccalaureate, 2015b).

One study reported that in Florida, acceptance into the IBDP varied from 25% to 100%, with an average of 73%. Most of these programs had minimum academic performance requirements, and most also required a parent's signature to participate (Perna et al., 2015). As noted previously, methods of parental involvement and academic encouragement vary across subgroups (Witenko et al., 2016), and they did in this study as well. Students without involved parents, students who were unaware of the opportunity for more rigorous coursework, or students whose teachers did not advocate for them would have found it harder to participate in the IBDP (Perna et al., 2015). Similarly, schools may deny students the opportunities to enroll in AP courses or learn new material if they think the student will not be motivated or successful, or have a strong system of support (Anyon, 1981; Watanabe, 2013). It is also possible that students may not be aware of AP or IBDP coursework opportunities.

The strengths of the AP and IBDP course curriculums and examinations have been externally vetted. A 2007 report by the Thomas B. Fordham Institute found that both programs set high standards for learning, aligned their examinations closely with their course content, and incorporated creative, complex thinking into their classrooms (Byrd, Ellington, Gross, Jago, & Stern, 2007). However, they caution that the quality of the instruction depends on the teacher, which makes the success of these courses more challenging in underfunded and poorly staffed school districts (Byrd et al., 2007). The extra training and professional development that IBDP teachers are required to undertake could potentially help mitigate this inequality in Title I schools, although research would be needed to validate this hypothesis. Research about the success of AP and IB programs

in high-poverty and minority schools revealed promising findings: teachers were generally able to modify support systems to encourage these disadvantaged populations to succeed. When motivated teachers were given the freedom and support to be flexible and accommodate the varied and additional needs of underprivileged students, these students flourished in these high-ability classrooms (Kyburg, Hertberg-Davis, & Callahan, 2007). In another study, gifted students tended to concur: they found the IB and AP coursework challenging and engaging, but noted that since these classrooms tended to have mostly privileged, white students in them, the one-size-fits-all approach did not create an environment for underprivileged students to thrive (Hertberg-Davis & Callahan, 2008). Similarly, these authors emphasized the importance of training teachers to teach these advanced courses and how to manage diversity of experiences in their classroom (Hertberg-Davis & Callahan, 2008). Although students are grouped appropriately by their academic ability levels and propensities, the inequities of their life experiences and access to resources can still create meaningful subgroups within the high-ability group.

Given the need to address the achievement gap in schools, it is worthwhile to provide an update on minority and low-income participation in the IBDP, particularly in Title I schools. Studies show that between 65% and 75% of minority students with a high academic achievement propensity do not take AP courses. Furthermore, an additional 600,000 minority or low-income students would need to participate in AP courses to close the participation gap (Theokas & Saaris, 2013). It would also be worthwhile to understand how low-income and minority students perform in the IB

program and how their participation affects their postsecondary enrollment. The inequality between rich and poor, minority and white, and highly educated in comparison to high school only graduates was established earlier in this paper. However, once low-income students attend an elite or ivy-league school their income gap diminishes significantly upon employment (Chetty et al., 2017). Education can be an important tool that enables people to move between economic classes, which further necessitates the need to remedy the inequalities in education and find tools that help low-income and minority students succeed and enroll in college. There is a dearth of literature regarding the accessibility of the IBDP to low-income and minority students in high-poverty schools, their performance within the IBDP, or their likelihood of enrolling in college once they participate in the IBDP. This study addresses that gap in the literature.

This study sought to answer the following research questions:

1. How has the availability of the IBDP in Title I schools changed over the last decade?
2. What are the racial and economic demographics of Title I schools that offer the IBDP, and how does this compare to the national average?
3. To what extent do minority and low-income students participate in the IBDP, and how does this compare to AP participation?
4. At what rate do low-income and minority IBDP participants in Title I schools enroll in college? How does this compare to the national average, and to non-low-income and white student enrollment?

5. Which student characteristics (race, income, gender, type) are predictive of college enrollment following completion of the IBDP?

CHAPTER 2: METHOD

Instruments

This study used secondary data from the following sources: (1) National Center for Education Statistics' (NCES) Common Core of Data (CCD); (2) IBIS, a data system maintained by the IB; and (3) the National Student Clearinghouse (NSC). CCD Elementary/ Secondary School Universe Survey is a national survey that “collects administrative data from state education agencies covering ... all public elementary and secondary schools and school districts in the U.S.” (Keaton, 2014, p. 1). Data used for these analyses were collected during the 2012-2013 school year.

IBIS is a database that includes limited demographic and assessment data for all students who take at least one IB exam, and administrative data for all schools that are authorized to offer the IB curriculum. Data are only available for students who take an IB examination; students who did not take an IB exam are not included in the analysis. Therefore, students who may have dropped out of the IB program or took a course but did not take the examination for that subject are not included in the analyses. CCD and IBIS school data were merged to identify Title I eligible IB schools in the U.S.

NSC is a data repository on student postsecondary enrollment, graduation, and degree attainment. Over 3,600 colleges and universities in the U.S., enrolling 98% of all students in public and private institutions, participate in the NSC (“National Student

Clearinghouse: Who We Are,” 2017). IBIS and NSC data were merged to identify IB students’ postsecondary trajectories.

IB exams are scored on a scale from 1-7; college credit is generally awarded for minimum scores of 5 or 6 on Higher Level (HL) exams, although this varies by college or university (International Baccalaureate, 2016). Students in the IB are generally enrolled as “Diploma candidates” indicating that they are attempting to complete the IB Diploma. In order to complete the IB Diploma, students are required to take six subjects with at least three at the HL and complete the Extended Essay (EE), Theory of Knowledge (TOK) course, and their Community and Service (CAS) requirements (“IBDP Curriculum,” 2017). Although both higher level and standard level (SL) subjects are described by the IBDP as rigorous, HL courses require 240 hours of instruction while SL courses require 150 hours of instruction (International Baccalaureate, 2015a). A passing score for students seeking the IB Diploma is 24, subject to other conditions (International Baccalaureate, 2014). Some schools also allow students to take certain courses without attempting to complete the IB Diploma; these students are referred to as “course-takers.” Enrolling in specific courses for college credit without the intent to complete the IB Diploma is similar to the structure of AP coursework.

When appropriate, statistics for the IBDP are compared to national figures. These figures are all obtained from NCES, and are cited in the results section.

Participants

The school sample consisted of 397 Title I public schools that are authorized to offer the IBDP and were identified in the CCD data (54% of all IBDP public schools in the U.S.). Of the 397 Title I IBDP schools, 281 of them (71%) were classified as Schoolwide Title I. The student sample used for these analyses included students from public high schools in the U.S. designated as Title I eligible, who graduated in 2013 and took at least one IB exam. The number of students taking at least one IBDP examination in a Title I public high school in 2013 was 43,100. Students who attended non-Title I eligible schools or private high schools were excluded. All 50 states and the District of Columbia were represented in the sample.

Students self-identify their race/ethnicity and it is reported in the IBIS database. Low-income status is identified as whether a student qualifies for Free/Reduced Lunch (FRL). Therefore, this categorical variable is dichotomized. College enrollment is also dichotomous: students either did or did not enroll in college. One outcome variable of interest in this analysis is immediate postsecondary enrollment, which is defined as enrollment following high school graduation (i.e., by January 31, 2014). Another outcome variable of interest in this study is IB exam score, which is found in the IBIS database. School and student demographics are provided in the results section under the research questions that address access and program participation.

Procedure

IBIS data were provided by researchers at the IB. NCES CCD data is publicly available and was downloaded from their website. Data were requested from NSC by the

IB for all 43,100 IBDP students who graduated high school in 2013 and took at least one IB high school level examination in their junior or senior years. NSC returned detailed enrollment data for 36,883 students (86%). However, data were not available for 14% of IB students of which approximately 3% represented records blocked by either institutions or students themselves. It is important to note that due to these blocked records, the postsecondary enrollment rates of IB students are slightly underestimated. An IRB was not necessary since this study was a combination of anonymized secondary datasets and publicly available data.

Analyses

Research questions 1, 2, 3, and 4 require descriptive analyses and use population level data to answer the research questions. Therefore, inferential statistical tests were not appropriate as there was no intent to generalize from a sample to a population. The use of effect size measures, such as Cohen's d (Cohen, 1969), odds ratios (Szumilas, 2010), and odds ratio conversions (Chinn, 2000) allow us to infer if differences are meaningful. Results are also presented graphically.

Logistical multilevel modeling was used to answer research question 5. Due to the hierarchical structure of the data (students are nested in classrooms, violating the independence assumption of regression), standard errors are underestimated if multilevel modeling is not employed (Raudenbush & Bryk, 2002). Students in the same schools will likely have similar experiences, and it is important to take that into consideration when analyzing the data. Multilevel models are also useful since they allow us to consider the impact of school level predictors (such as the percent of low-income

students) on student achievement. The multilevel modeling equation is presented below in Figure 1.

$$\text{Level 1: } y_{ij} = \beta_{0j} + \beta_{1j}x_{ij} + \varepsilon_{ij}$$

$$\text{Level 2: } \beta_{0j} = \gamma_{00} + \gamma_{01}z_j + u_{0j}$$

$$\beta_{1j} = \gamma_{10} + \gamma_{11}z_j + u_{1j}$$

...where x_{ij} is a level one person level covariate and z_j is a level two school level covariate. For this paper, person level covariates are race, gender, income, and student type (Diploma candidate or course-taker). School level covariates are percent low-income and percent minority (non-white) students.

Figure 1. The multilevel modeling equation and a list of predictors/covariates used in this study.

Predictor significance was evaluated in the .05 alpha level. To increase interpretability, all level one variables were group mean centered while all level two variables were grand mean centered (Enders & Tofighi, 2007). To calculate effect size measures, standardized coefficients are reported. To determine the overall model efficacy and fit for the logistic model, the percent of students correctly classified into groups was compared to the null model. Effect size and model fit are also calculated using the proportion variance reduction equation (Peugh, 2010). The null model gives us the information necessary to calculate the intraclass correlation coefficient (ICC) which determines what proportion of variation in the outcome is due to school membership (Raudenbush & Bryk, 2002). The best fitting model was chosen using a χ^2 difference test (Peugh, 2010). The software HLM version 7.0 was used to compute the logistic regression model.

CHAPTER 3: RESULTS

Research Question 1

The number of IB program offerings in the USA has grown exponentially since its inception (International Baccalaureate, 2017) as has its availability in Title I schools. In 2003, 16% of IBDP programmes were offered in Title I schools (Perna et al., 2015). In 2013, this proportion jumped to 54%. By comparison, 68% of all schools in the United States were classified as Title I eligible (Common Core of Data, 2013). Thus, the presence of the IBDP has increased noticeably in Title I schools, although it still falls below the proportion of Title I eligible schools.

Research Question 2

For minority and low-income students to participate in higher track educational programs, they must be available in the schools that minority and low-income students attend. Thus, research question two was concerned with the accessibility and accessibility of the IBDP to these students. As seen below in Figure 2, the demographics of Title I schools that offer the IBDP have some notable similarities and differences in comparison to the composition of nationwide Title I schools. Black and Asian students are overrepresented in the population of Title I schools offering the IBDP in comparison to national statistics. However, White students, low-income students, and Native American students are under-represented. The proportion of Hispanic students and those

who identify ethnically as “other” match the national average. Black students and Asian students in Title I schools are 1.7 and 2.5 times more likely than White students to attend a Title I school that offers the IBDP. However, White students are three times as likely to attend a Title I school offering the IBDP than Native American students.

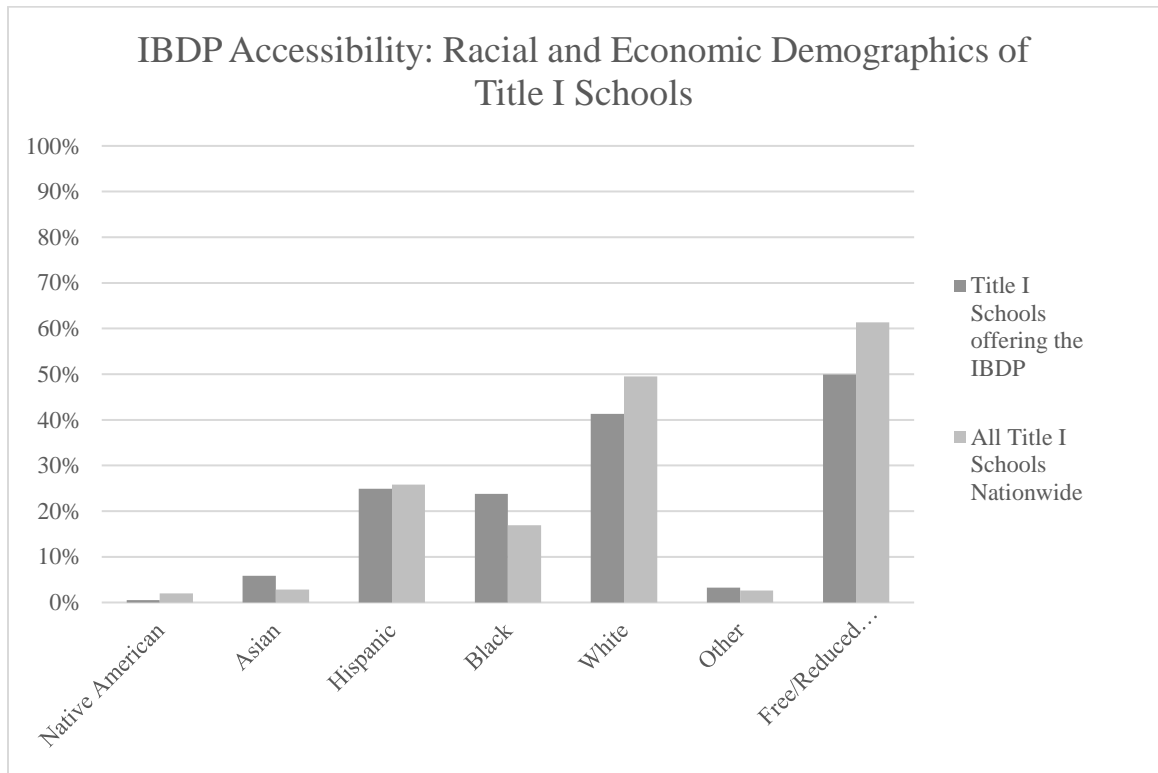


Figure 2. The racial and economic demographics of students in Title I schools that offer the IBDP. Comparisons are made to the demographics of all Title I schools in America (NCES, 2013).

Research Question 3

As discussed earlier, the implementation of the IBDP in each school district is not uniform. Thus, attending a school that offers the IBDP does not guarantee that students will or will be able to participate in the IBDP. Participation in the IBDP is measured here by the taking of one IBDP examination, although it is worth reminding the reader that

students may take an IBDP course without taking the IBDP examination. However, there will be no official record within the IB of their participation and they will be unable to receive college credit.

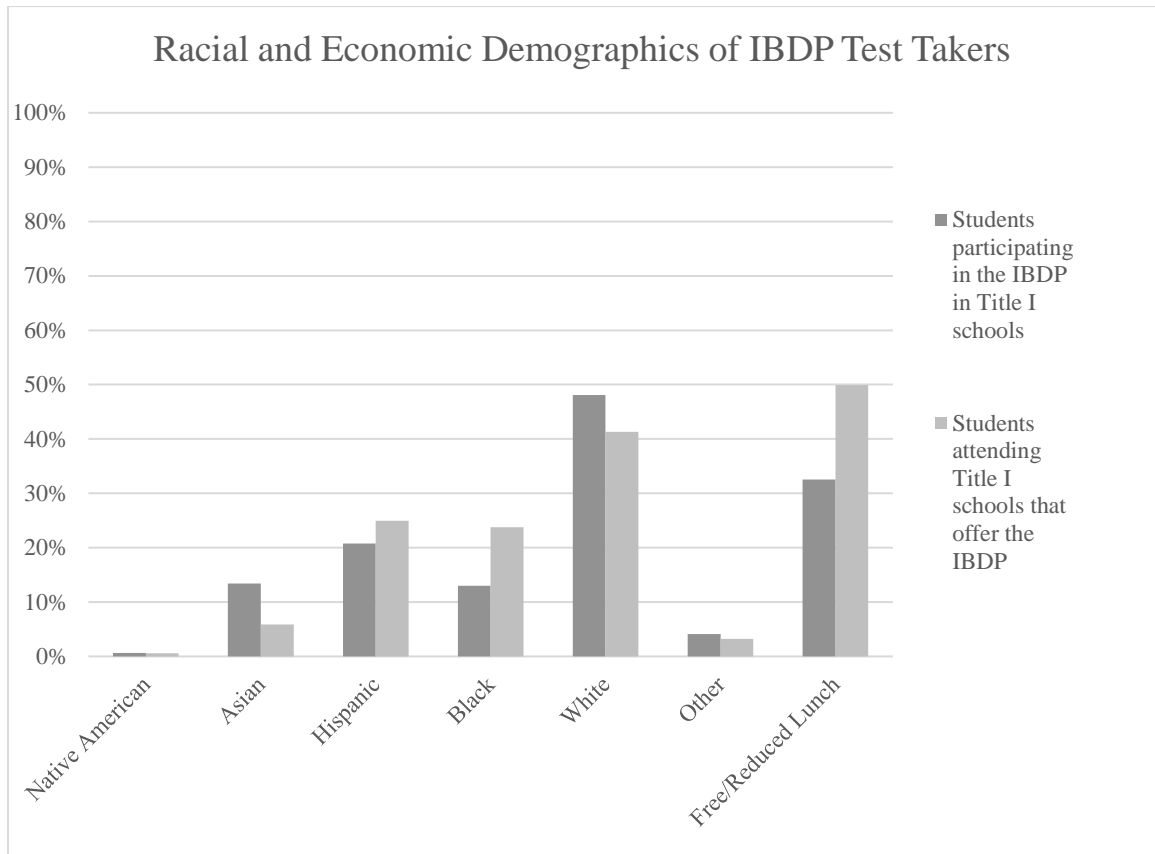


Figure 3. A comparison of the racial and economic demographics of IBDP participants and the demographics of students who attend schools that offer the IBDP.

There are noticeable differences between IBDP accessibility and participation, as evidenced above in Figure 2 and Figure 3. Although Black students are 1.7 times more likely than White students to attend a Title I school that offers the IBDP, White students are 2.1 times more likely than Black students to participate in the IBDP. Asian students are overrepresented in both IBDP accessibility and participation: Asian attendance at

Title I schools offering the IBDP is higher than the national proportion, and the proportion of Asian students participating in the IBDP is more than double the proportion of Asians attending Title I schools that offer the IBDP. Asian students account for only 2.8% of students who attend Title I schools nationwide, but 13.4% of IBDP test takers in Title I schools are Asian. Alternatively, Black attendance at Title I schools offering the IBDP is also higher than the national proportion; however only 13% of all IBDP test takers are Black even though almost 25% of these student bodies identify as Black. Thus, Asian students are highly over-represented in the IBDP, and Black students are highly under-represented.

Title I funds are allocated when there is a high proportion of low-income students in a school district. However, we find that students receiving free or reduced lunch are under-represented among the IBDP test taking population in Title I schools. Although 50% of students that attend Title I schools that offer the IBDP qualify for free or reduced lunch, only 32.5% of low-income students in these schools participate in the IBDP. It is impossible to know if Title I funds are specifically allocated by school districts to fund the IBDP, and that is irrelevant as that is not how Title I funds are required to be spent. However, it is still worth mentioning that more than two thirds of students in Title I schools participating in the IBDP are not low-income, which does not match the demographics of the Title I student body.

Interestingly, the IBDP is still more equitably diversified than the AP cohort (CollegeBoard, 2014). While 13% of IBDP test takers are Black, only 9.2% of AP test takers identify as Black. Slightly more IBDP test takers identify as Hispanic (20.7%)

than do AP exam takers (18.8%). The same proportions of Native American students are found in the IBDP and AP population (0.6%). Forty-eight percent of IBDP test-takers identify as White, while 55.9% of AP exam takers identify as white. Asian students are less over-represented in the AP population; 10.7% of AP exam takers identify as Asian, in comparison to 13.4% of IB test-takers. Thus, under-represented minorities are better represented in the IBDP than in the AP, while White students are noticeably over-represented in the AP population and Asian students are over-represented in both the IB and AP population, although more so in the IB population. It should be mentioned that the AP doesn't identify a racial/ethnic category of "Other," so the proportions of IB test-takers are underestimated by roughly 0.8% since that comparison is unable to be made.

The proportions of low-income students participating in the IBDP and the AP are comparable. Thirty-two and a half percent of IBDP test-takers are low-income, while 28.5% of AP exam takers are low-income. Thus, slightly more low-income students participate in the IBDP in Title I schools. The data provided by the AP are not limited to Title I schools, and instead encompass the entire AP exam taking population from all schools in the United States. The comparisons are worth making but it should be noted that they come from distinctly different samples and that the statistics are only descriptive. Further information would need to be provided by the CollegeBoard to make comparisons between the IBDP and AP (CollegeBoard, 2014).

Research Question 4

Although Black, Native American, and low-income students are under-represented in the IB and do not perform as well within the IB, their college enrollment

proportions tell a different story. Black students who participate in the IBDP enroll in college at the highest rate of all races and ethnicities in the 2012-2013 population. Furthermore, low-income students who identify as Black enroll in college at higher rates than non-low-income Asian students, and at nearly identical rates to non-low-income White students. Black college enrollment is highest across all race/ethnicities for both low-income and non-low-income economic status. National data broken down by both race and ethnicity are unavailable for Title I schools, so comparisons are made with national statistics for race/ethnicity from all public and private schools. As seen below in Figure 4, IBDP students in Title I schools out-perform their respective national proportions.

In an effort to make comparisons to low-income students nationally as well as IBDP students that are not in Title I schools, Figure 5 is presented below. Title I school status appears to have little effect on college enrollment for students that participate in the IBDP. While college enrollment figures for IBDP students that are not in Title I schools are the highest at 82.4%, students in Title I schools have virtually the same college enrollment rates. Low income students in Title I schools enroll in college at an average rate of 78.9%, while non-low-income students in Title I schools enroll in college at an average rate of 82.2%. Again, these numbers far exceed the national averages: the national average for college enrollment across all students is 65.9%, and 45.5% for low-income students nationally.

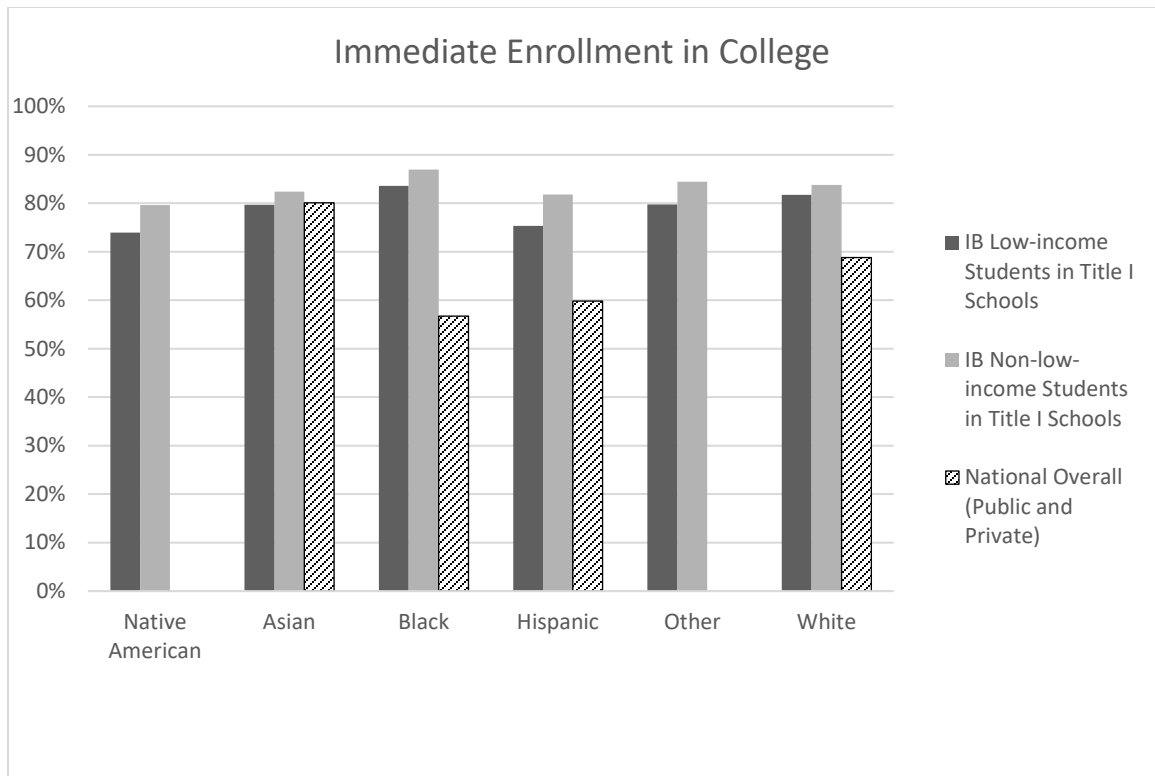


Figure 4. College enrollment statistics by race/ethnicity and income for IBDP students in Title I schools in comparison to national statistics.

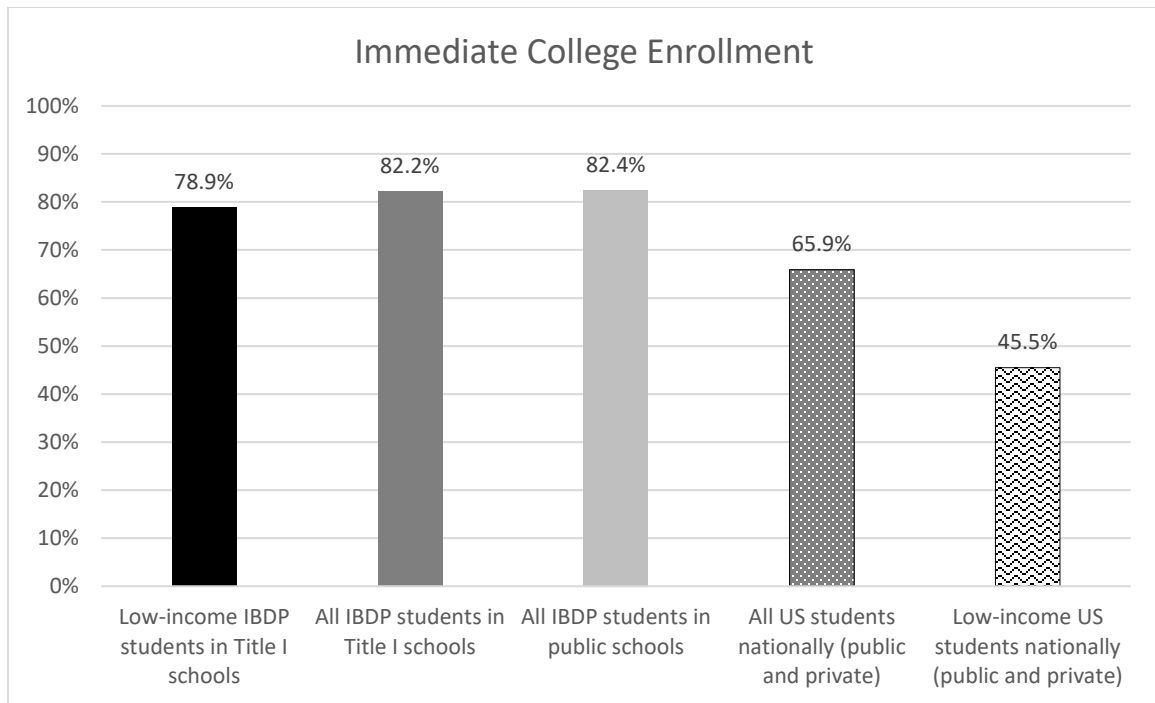


Figure 5. Immediate postsecondary enrollment by economic status.

Research Question 5

At this point we know that there are differences in immediate college enrollment by race/ethnicity and income, but we do not know if the differences are significant or meaningful. In order to investigate which factors predict immediate college enrollment, I employed a logistic multilevel model, which nested students within their respective schools. Doing this allows us to determine the extent to which both student and school level demographics influence immediate college enrollment. Unfortunately, data were not available from a non-IB or AP sample, so there was no opportunity to test the importance of IB programme participation as there was no counterfactual sample available. The only way this can be done is by visually comparing college enrollment rates of IB students to national statistics in the graphs in research question 4, although the

samples are not comparable or statistically meaningful, and results should be interpreted with caution. Thus, the only data used in this model were data for students who participated in the IB, and comparisons are only able to be made across IB student and school characteristics.

Predictor variables (see Table 1) were group mean centered in the level one model and all slopes were allowed to vary across schools. Allowing slopes to vary across schools enables us to determine if the effect of the level one variable varies across school membership. For example, the effect of average IBDP exam grade could be stronger from some districts than others; knowing this would allow us to further investigate why this occurred and to potentially use some school districts as a model for others.

The level two variables (see Table 1) were all added as contextual effects and were grand mean centered. Adding a variable as a contextual effect allows the researcher to determine if there is an effect at level two above and beyond the effect at level one. For example, we know that economic status may impede a student's likelihood of enrolling in college, but the contextual effect allows us to determine if the proportion of low-income students in the school has an effect on a student's likelihood of enrolling in college above and beyond their personal economic status.

Table 1. All variables at each level included in the multilevel logistic regression model

Dependent variable	<i>Immediate college enrollment:</i> College enrollment following 2013 high school graduation, prior to January 31, 2014 or no college enrollment.
Level one variables	<p><i>Average DP exam grade:</i> This variable is used as a proxy for high school academic achievement. These exams are each scored on a scale of 1-7. Students may take multiple exams.</p> <p><i>Low-income:</i> Student eligibility for free and reduced-price meals (FRPM) is used as a dichotomous proxy for low-income status, indicating that students are either low-income or not.</p> <p><i>Student race/ ethnicity:</i> (Native American; Asian/Pacific Islander; Black/Non-Hispanic; Hispanic; White/Non-Hispanic; Other).</p> <p><i>Student category:</i> Students are indentified as either full diploma students or course-takers. Course-taking students may take as few as one DP examination and complete a different high school curriculum. Diploma students complete the DP curriculum for all of their courses and take all DP course examinations.</p> <p><i>Gender:</i> (female; male)</p>
Level two variables	<p><i>Average School low-income status:</i> Mean aggregate of all students in the school that qualify for free and reduced-price meals.</p> <p><i>School race/ethnicity:</i> The percentage of each race/ethnicity in each school.</p> <p><i>School exam score aggregate:</i> The average IBDP exam score across all IBDP students in each school. This variable is used as a proxy for academic ability/achievement.</p>

In addition, within-level interactions and cross-level interactions were specified as well. For example, it was hypothesized that the intersection of a student’s economic status and race/ethnicity could have a have stronger or weaker effect on their likelihood of enrolling in college dependent upon their group membership. Descriptive statistics illustrating the differences between the two outcome groups on the independent variables

are presented in below in Table 2. As illustrated, the two groups are generally comparable on the covariates.

Table 2. Descriptive statistics for both outcome groups.

	Immediate Enrollment			
	Yes (<i>n</i> = 16,765)		No (<i>n</i> = 3,638)	
	Mean/ Proportion	Standard Deviation	Mean/ Proportion	Standard Deviation
<i>Average Exam Grade</i>	4.06	.99	3.95	1.11
<i>Student Category</i>	.51	.50	.41	.49
<i>Race/ethnicity: Black</i>	.13	.34	.11	.31
<i>Race/ethnicity: Hispanic</i>	.20	.40	.26	.44
<i>Race/ethnicity: Native American</i>	.01	.08	.01	.09
<i>Race/ethnicity: Other</i>	.04	.20	.04	.19
<i>Race/ethnicity: Asian</i>	.13	.34	.14	.35
<i>Race/ethnicity: White</i>	.49	.50	.44	.50
<i>Qualifies for free or reduced-priced meals</i>	.31	.46	.39	.49
<i>Gender</i>	.59	.49	.55	.50

The results from the final model are presented below in Table 3. The final model resulted in no significant level two predictors, no significant cross-level interactions or contextual effects, no significant slope variations, and only one significant within-level interaction. The lack of significance at level two tells us something interesting about the 2012-2013 IBDP cohort: the school level variables used in this dataset (school low-income status, school ethnicity, and average IBDP schoolwide achievement) had no impact on an IBDP student’s likelihood of enrolling in college.

Table 3. Coefficients from the final logistic multilevel model.

	Coefficient	Odds Ratio	Confidence Interval	Effect Size ⁱ
Intercept (γ_{00})	1.60	4.97	(4.63, 5.33)	.89
Low-income ⁱⁱ Slope (γ_{10})	.37	1.45	(1.26, 1.67)	.21
Race/Ethnicity: Black ⁱⁱⁱ Slope (γ_{20})	.27	1.31	(1.14, 1.52)	.15
Race/Ethnicity: Hispanic Slope (γ_{30})	-.25	.78	(.69, .88)	-.14
Race/Ethnicity: Native American Slope (γ_{40})	-.51	.60	(.40, .91)	-.28
Race/Ethnicity: Other Slope (γ_{50})	.04	1.04	(.76, 1.41)	.02
Race/Ethnicity: Asian Slope (γ_{60})	-.10	.91	(.79, 1.04)	-.05
Gender Slope ^{iv} (γ_{70})	.20	1.22	(1.13, 1.32)	.11
Student Category ^v Slope (γ_{80})	.60	1.83	(1.53, 2.18)	.33
Student Category*Low-income Slope (γ_{90})	-.35	.70	(.58, .85)	-.20

ⁱ Effect size was computed using Chinn's (2000) conversion from odds ratios to Cohen's *d* (Cohen, 1969) effect size measure.

ⁱⁱ Low-income was coded as 0, while non-low-income was coded as 1.

ⁱⁱⁱ White was coded as 0 for all race/ethnicity slopes and is therefore the reference category.

^{iv} Female was coded as 1; male was coded as 0.

^v Diploma candidates were coded as 1; course-takers were coded as 0.

However, there are many significant predictors at level one. When comparing students who qualified for free/reduced price meals with those who did not, we find that students from non-low-income families are 45% more likely to enroll in college. Since the hypothesized interactions between ethnicity/race and economic status were all non-significant, we find that this trend is stable across all races/ethnicities. Given that this trend was observable in Figure 4, this finding was not surprising.

Unsurprisingly, there were still significant and fairly meaningful effect sizes in terms of differences of likelihood of immediate college enrollment by race/ethnicity and economic status as stand-alone main effects. Black students were 1.3 times more likely to enroll in college after completing the IBDP than White students. Conversely, Hispanic and Native American students were less likely to enroll in college than White students (with effect sizes of $-.14$ and $-.28$ respectively). The comparisons of Asian students and students who identify as “Other” were significant but not meaningful because the effect sizes were below $.1$.

Additionally, as reflected in Figure 4, non-low-income IBDP students were more likely to enroll in college than low-income students. The average percentage gap of three percent across all races is small but meaningful, with an effect size of $.21$. The largest effect was found for the variable student category, which had a significant interaction with student economic status. Students who elect to participate in the full IB Diploma are almost two times as likely to enroll in college as their course-taking peers. However, results indicated that while non-low-income students were more likely to enroll in college, the effect was weaker for students aiming for the IB Diploma. Therefore, income had a stronger effect for course-taking students in that low-income students were significantly less likely to enroll in college than their low income Diploma student peers. For students who pursued the IB Diploma, the impact of their economic status on their college enrollment likelihood was less strong.

In an effort to evaluate the strength of the model, I consulted the level one residual file to determine how often the final model correctly classified students into their

college enrollment category, and compared it to the null model. Both the null and the final model correctly allocated 82.1% of the students to the correct outcome group, indicating that the included predictors did not increase the model's ability to correctly allocate students to the outcome groups. While it is important to consider the statistical significance of these predictors, it is also worth noting that the addition of these predictors did not increase the model's ability to correctly allocate each student to their outcome group.

DISCUSSION

The findings from this study are exciting and new in some ways, but also confirm the existence of many well-established patterns in the academic literature. There is evidence of the availability of the IBDP in Title I schools, but its accessibility is questionable; low-income and under-represented minority students are under-represented in the IBDP, despite its availability in their local schools.

Although economic status and race/ethnicity are typically some of the strongest predictors of academic achievement (Reardon, 2011; Reardon et al., 2017), we find that the effects may be mitigated by participation in high ability academic tracks if we consider college enrollment to be a form of academic achievement. Within the IBDP 2012-2013 population, Black students enrolled in college at the highest rates even after controlling for low-income status, which is very unusual in comparison to national statistics. In terms of postsecondary enrollment, students of all races/ethnicities and income statuses appear to enroll in college at high rates. This does not negate the fact that income is still a significant predictor of college enrollment at this model, but the effect size is small, the college enrollment gap is small, and low-income college enrollment upon completion of the IBDP was very high at 79%.

The inequality of accessibility of high track programmes such as the IBDP is perhaps one of the most meaningful findings in this study, as well as one of the biggest

flaws of the system of education in the United States. This study shows clear benefits to participation in high ability tracks, but students are unable to reap these benefits if they do not have the opportunity participate in these programs. The CollegeBoard describes this as the “greatest loss of potential,” noting that on average, 60% of students with high potential for success in high ability coursework such as the AP are not participating (CollegeBoard, 2014). The gaps vary by ethnicity: only 30% of academically capable Black students and Native American students take AP courses, in comparison to 60% of Asian students. As Witenko (2016) suggests, students from different races/ethnicities may require different methods of support and encouragement in their academic pursuits. The findings from this study also reflect the findings from Coley and Baker (2013), who note that students from low-income families face even more barriers to educational achievement as they are less likely to have parents with the time, money, knowledge and general resources to advocate for them.

However, this is not meant to conclude that parents or non-academic staff are meant to blame for low participation rates of low-income and under-represented minority students. As mentioned earlier, there may be many barriers to participation in the IBDP including prior achievement requirements, teacher recommendations, and entrance exams. The cost alone of examinations could be prohibitive. These speculations could be confirmed or rejected with further research; the main conclusion from this study is that the gaps in participation exist and are noticeable. It should also be mentioned that attempting to solve issues of inequality at the tail end of a secondary education are likely futile; these issues should be addressed during early education to prevent inequalities in

secondary and postsecondary education. The importance of minority role-models should not be forgotten either (Padilla, Trevino, Gonzalez, & Trevino, 1997; Rendon, Jalomo, & Nora, 2000). If minority students do not participate in high ability tracks and are unable to reap the benefits of participation, they will be unable to provide the support and guidance their children need. The cycle must be broken.

Another interesting finding centers on the insignificance of all school-level predictors in the multilevel model that predicted college enrollment. Finding all non-significant level two effects means that school level variables had no effect on the likelihood that a student would enroll in college. Thus, students in high poverty and low poverty schools, or high minority and low minority schools, were equally likely to enroll in college (holding all other variables constant). Qualitative research supports this finding; IB students report finding “comfort in sameness” in their cohesive, homogeneous IB cohorts. Similarly, IB students reported tensions between IB and non-IB participants within their school (Park et al., 2014). Given that quantitative findings show no school level effects on academic success, and that qualitative studies affirm the close-knit nature of IBDP participants, we can tentatively conclude that the IB creates a sort of “bubble effect” within a school district, in which IB participants are more immune to their surroundings. Conversely, we must also consider the negative effect this may have on non-IB participants, who may see the IB as unwelcoming to “people like them”. When reflecting on the IB, some black IB students have described the IB as cohorts of “intellectual Aryans” in which they felt that discussions of race were undesirable, and described the IB as appropriate for white, privileged students (Hertberg-Davis &

Callahan, 2008). The “bubble effect” may be helpful for students who are participating in the IB, but it may also hinder the likelihood that low-income or minority students would attempt to participate in the IB. The reader should be reminded of the importance of the teacher and the flexibility of the program implementation: when IB teachers do not use a one-size fits all approach, and instead tailor their classrooms to support students from a wide variety of backgrounds, minority and low-income student retention is high and consequentially more students succeed (Kyburg et al., 2007).

The perhaps unintended exclusivity of the International Baccalaureate could continue be called into question in terms of curriculum. The IB professes to have a global and international focus; international mindedness is one of the program’s core components (International Baccalaureate, 2012). However, for two IB schools in Mauritius, researchers, students and staff have found a westernized curriculum with traces of colonialism that fails to embrace local knowledge and identities, and employs white, foreign heads of schools (Poonoosamy, 2010). Conversely, some American parents have opposed the international focus of the IB, calling it un-American (Lewin, 2010). Given its European origins (International Baccalaureate, 2015), it could be hypothesized that the IB has a euro-centric focus that employs predominantly white teachers. The second finding wouldn’t be surprising; 82% of all teachers in public schools in 2012 identified as white (Department of Education, 2016). No data is available on the race/ethnicity of IB teachers, but this would be worth investigating to invite a more inclusive and heterogeneous cohort of IB students.

A natural next step to consider is rates of college success, in terms of completion, by both race and gender. Although this sample of high school graduates has not had the opportunity to graduate from college at the time of this writing, there is another study that compares college completion rates of all IB students from both public and private high schools in the United States who graduated in the 2007-2008 school year (Caspary, Woodworth, Keating, & Sands, 2015). These results show a noticeable gap in college graduation by both income and IBDP student category. The six-year college graduation rate for non-low-income students who participated in the full Diploma was 82%; for low-income students it was 72%. However, a larger gap exists for course-takers: 72% of non-low-income students graduated within 6 years in comparison to 55% of low-income students. While this study shows that participation in the high achievement tracks such as the IBDP results in high college enrollment rates across all races and levels of income, the relationship to college graduation is not clear. In comparison to national statistics (Nichols, 2015), students who participated in the IBDP appear to graduate at higher rates: on average, 51% of Pell Grant recipients graduate from college in six years, while 65% of their non-Pell Grant peers accomplish the same goal.

The findings from this study breed both hope and significant areas for improvement. Once students are in high ability tracks such as the IBDP, they appear to do well and enroll in college at very high rates. Upon participation in the IBDP, student income status, race/ethnicity and prior academic achievement appear to have little effect on their likelihood of college enrollment. There is a clear path forward for all high ability tracking groups: the gap in accessibility needs to be addressed. Only in providing

avenues of support that address the unique needs of low-income and minority students will we be able to close the opportunity gap.

Limitations

The availability of data created the biggest hindrances to the conclusions I could draw from this study. Since there was no non-IB sample to compare to, I was unable to study the impact of the IB programme in comparison to a matched sample of students, and could only rely on national statistics and national results provided by the AP (NCES, 2013; CollegeBoard, 2014). Additionally, since the sample of students has yet to graduate from college, the long-term rates of success of IBDP participants could not be studied. Finally, data on performance within the IBDP (such as exam grades) were unavailable, and thus I was unable to compare academic achievement within the IBDP by race/ethnicity and income.

Future research could investigate the different types of barriers to IBDP participation. Are the obstacles within the control of the school districts: academic performance requirements, insufficient funding to pay for the IBDP for all students, or are students only admitted by teacher/staff recommendations? Or are the barriers to participation a reflection of the well-established patterns of unequal access to opportunities for low-income and minority students? Understanding the causes and the unique needs of different types of students will allow districts and the IBDP to focus their efforts on paths that will continue to lead towards greater equality of participation across race/ethnicity and income.

Other directions for research could focus on performance within the IBDP by race/ethnicity, on college graduation rates of IBDP students by race/ethnicity, and on creating a matched sample of comparative non-IBDP students to evaluate the effectiveness of the IBDP. It also would be worthwhile to investigate the types and rankings of colleges that IB students enroll in, as well as the subjects they subsequently major in, summarized by race/ethnicity and income. Future research could additionally consider investigating the proportion of IB students that take exams in STEM subjects, in comparison to students in AP.

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