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# A Regression Model Approach to First-Year Honors Program Admissions Serving a High-Minority Population

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## INTRODUCTION

Many honors programs make admissions decisions based on student high school GPA and a standardized test score. However, McKay argued that standardized test scores can be a barrier to honors program participation, particularly for minority students. Minority students, particularly Hispanic and African American students, are apt to have lower standardized test scores than other ethnic groups according to the 2013 national ACT Profile Reports on “Black/African American Students” and “Hispanic/Latino Students.” Thus, honors programs that serve high-minority populations need to find new honors program solutions that will help their university community as well as encourage a high standard of academic excellence.

While past research has questioned the usefulness of the standardized test in honors program admissions (Green & Kimbrough; Khé), less attention

has been given to honors program admissions standards that work to predict success in honors programs for underserved populations. The purpose of my study is to explore this topic further. My study uses stepwise regression analyses to find high school student and institution variables that predict college-level success in honors program admissions. This study adds to past research on admission standards, arguing for more quantifiable and holistic approaches to honors program admissions that reveal a likelihood of success in honors programs and college GPA. The results of this study introduce new variables worthy of future study on the topic of honors program admissions.

## **INSTITUTIONAL CONTEXT**

In 2014, the Governors State University (GSU) Honors Program began serving a four-year university community. As applications for the first freshman class came in, it was evident that our four-year honors program would serve a high-minority population of students as more than 70% of the applicants in the first class were people of color (University Fast Facts Fall 2014) and over 80% Pell-eligible. Past scholarship suggests that minorities are an underrepresented population in honors programs (McKay). Moreover, many students were coming to our institution from high schools with low college readiness. Consequently, GSU attracted many talented students who struggled with standardized test scores and would often need to complete co-requisite requirements for first-year English and math courses. Having a standardized test score requirement for admissions, in line with sister state institutions, evidently acted as a barrier to honors program participation. From 2014 to 2016, admissions decisions were made on an indexed “GSU Honors GPA” that was a combination of unweighted high school GPA and the number of honors and AP classes taken. No one was rejected from the honors program solely based on his or her standardized test scores.

## **PAST LITERATURE**

### **Admissions Criteria**

Having clear criteria for admission is considered a basic characteristic of an honors program (National Collegiate Honors Council). What the admissions criteria are can vary widely. Past research has looked into different variables to identify what they can tell us about potential honors program students. One variable found to have a robust predictive ability is high school GPA. Wolfe and Johnson as well as Anastasi found that high school

GPA could account for 18–19% of the variance in college GPA scores. Additionally, McKay argued that high school GPA could serve as a variable that predicts program completion.

Beyond high school GPA, there is a debate on other variables of value in honors program admissions. Perhaps the most discussed variable is the standardized test score. Past research has questioned their importance (Green & Kimbrough), their relevance (Khé), and their ability to predict either program completion (McKay) or (Smith & Zagurski). Khé questioned their relevance when his research found a lack of consistency between high school GPA and college graduation GPA over a five-year period at his institution. Green and Kimbrough did not find statistically significant correlations between the SAT or ACT scores and college GPA. McKay argued that standardized test scores did not predict retention or completion of an honors program. More recently, Smith and Zagurski found that there was no predictive relationship between college GPA and standardized test scores; they also recommended that the standardized test score should receive less weight in a multi-criteria model of honors program admissions than six other variables, including both quantitative (GPA, class rank) and qualitative evaluations (recommendations, student essays, small group discussion) that can be later quantified for their admission purposes.

While past research questions the value of standardized testing in honors program admissions, a consistent finding across all referenced studies has been that honors students, on average, have high standardized test scores. All studies referenced university honors program populations with average ACT Composite scores of 26–29 (Smith & Zagurski) and SAT score averages in the 1190 to 1300 range (Khé; McKay). Scores in this range are 1–2 standard deviations above the benchmark for college readiness (21 ACT Composite Score; 18–22 ACT Subject Scores) as defined in “The ACT Profile Report—National Graduating Class 2016.” Based on past studies, I suggest that the perceived irrelevance of the standardized test score is not because the value of the test is intrinsically irrelevant. Rather, the entrance ACT or SAT score required for admissions to honors programs is often so high that its predictive value for college readiness and college GPA becomes irrelevant for those honors programs.

## **Minority Populations**

Past research in honors education has rarely examined admissions variables as predictors of college GPA in the context of high-minority populations.

Except for McKay's study, research has focused on honors programs with predominately Caucasian populations. Moreover, McKay's study concentrated on predicting retention in honors, not college GPA. Because minority students are often underserved in honors programs, it is important to examine what variables can predict their GPA in honors and how these results compare with past research.

Data from the ACT support McKay's argument that honors program admissions standards with high standardized test scores serve as a barrier to minority participation. According to "The ACT Profile Report—National Graduating Class 2016," the average African American student scores 5.2 points lower and the average Hispanic student scores 3.5 points lower on the ACT Composite than the average Caucasian student. The ACT's 2013 "Profile Report" on African American and on Hispanic students showed that only 3% of African Americans and 10% of Hispanics nationally earned an ACT composite score of 25 or better, which is below many honors programs' minimum admission standards.

Additionally, data suggest that a disproportionate number of African American and Hispanic students attend high schools in which a low percentage of students are deemed college ready. In the City of Chicago, for example, over a dozen high schools south and west of the downtown area are almost entirely populated by minority students. In these schools, students earn high GPAs (3.75–4.00 unweighted) and have completed an extensive array of AP and honors courses. However, in these same schools, 97% or more of a school's graduating class will earn less than 21 on the ACT, will thus not be deemed college ready according to the Illinois Report Card 2015–2016, and will go ignored by most universities and honors program admissions staff. Ratings of a high school by the college readiness of its graduates, as it pertains to predicting an honor student's college GPA, has not been examined in past honors scholarship.

## RESEARCH QUESTIONS

Honors programs that work with underserved populations or seek ethnic diversity typically reexamine potential admissions predictor variables and how much variance they can account for in predicting college GPA. I thus propose the following research questions:

- RQ1: What high school student variables predict GPA success in the first semester in college for honors program students?

- RQ2a: What high school student variables predict GPA success in the first semester in college for African American honors program students?
- RQ2b: What high school student variables predict GPA success in the first semester in college for White (Caucasian and Hispanic) honors program students?
- RQ2c: What high school student variables predict GPA success in the first semester in college for Caucasian honors program students?
- RQ2d: What high school student variables predict GPA success in the first semester in college for Hispanic honors program students?

## METHOD

### Participants

The data for this regression analysis include the entering class of 2014 through the entering class of 2016 at GSU. During this three-year period, 65 freshmen participated in the GSU Honors Program, and 61 students completed the first semester. The students had an average unweighted HSGPA of 3.46 on a 4.00 scale and an average ACT composite score of 21.4. The students earned an average first-semester GSU GPA of 2.95. For this timeframe, students were accepted into the GSU Honors Program if they had a 3.40 “GSU Honors GPA” or better. The GSU Honors GPA is an index score comprising a student’s unweighted HSGPA multiplied by 1.xx, where xx equals the number of full-year honors and AP classes completed in high school. For example, if a student completed 10 honors or AP classes in high school, the unweighted high school GPA would be multiplied by 1.10 to determine the GSU Honors GPA. The average GSU Honors GPA for the accepted students was 3.75.

Of the 65 honors program freshmen, 31 were African American (46%), 15 were Hispanic (22%), 15 were Caucasian (22%), and 4 were other ethnicities or mixed race (6%). Fifty-two students (80%) were Pell-eligible. In the college readiness of the high school, 17 students (25%) came from schools less than 15% college ready, 25 students (37%) came from schools 16–30% college ready, 2 students (3%) came from schools 31–45% college ready, 14 (21%) came from schools 46–60% college ready, and 6 (9%) came from schools 61–75% college ready. One student was an international student and could not be evaluated on this variable.

## Procedures

Stepwise regression analyses were done on 13 different data variables found in the students' high school application data (gender, ethnicity, Pell eligibility, college readiness of the high school, unweighted high school GPA, GSU Honors GPA, number of honors and AP classes completed in high school, class rank, ACT composite score, ACT English score, ACT Reading score, ACT Math score, and ACT Science score) to try to find predictive variables of college GPA.

College readiness of the high school was defined by the Illinois State Board of Education as the percentage of students at a high school that earned a 21 ACT composite score or higher (Illinois Report Card 2015–2016). This percentage was converted to a seven-point Likert scale variable at 15% intervals: 1 = high school is 00–15% college ready, 2 = high school is 16–30% college ready, 3 = high school is 31–45% college ready, 4 = high school is 46–60% college ready, 5 = high school is 61–75% college ready, 6 = high school is 76–90% college ready, 7 = high school is 91–100% college ready. For out-of-state and private-school students, the school's ACT Composite average was converted to the college readiness score that corresponded to the appropriate level of college readiness among ISBE Public Schools: 1 = ACT Composite Score 1–16, 2 = ACT Score 17–18, 3 = ACT Score 19–20, 4 = ACT Score 21–22, 5 = ACT Score 23–24, 6 = ACT Score 25–27, 7 = ACT Score 28–36. The stepwise regression analysis discussed in the Results section represents the model that depicted the highest percentage of variance accounted for by the 13 variables analyzed.

## RESULTS

Research Question 1 was “What high school student variables predict GPA success in the first semester in college for honors program students?” A stepwise regression analysis revealed a three-predictor model (GSU Honors GPA, college readiness of the high school, ACT English), statistically significant, that accounted for 47.8% of the variance in first-semester college GPA ( $F[3, 55] = 16.773, p < .0001, R^2 = .478$ ). Table 1 shows the descriptive statistics and regression coefficients. Each of the predictor variables had significant ( $p < .0001$ ) Pearson correlations with first-semester college GPA, with scores in the 0.43–0.55 range.

Research Question 2a was “What high school student variables predict GPA success in the first semester in college for African American honors

program students?” A stepwise regression analysis done on the African American honors program population ( $n = 29$ ) revealed a two-predictor model (GSU Honors GPA, ACT English), statistically significant, that accounted for 43% of the variance in first-semester college GPA ( $F[2, 26] = 9.825, p < .0001, R^2 = .430$ ). Table 2 shows the descriptive statistics and regression coefficients. Each of the predictor variables had significant ( $p < .02$ ) Pearson correlations with first-semester college GPA, with scores in the 0.38–0.56 range.

Research Question 2b was “What high school student variables predict GPA success in the first semester in college for White (Caucasian and Hispanic) honors program students?” A stepwise regression analysis done on the White honors program population ( $n = 29$ ) revealed a two-predictor model (GSU Honors GPA, college readiness of the high school), statistically significant, that accounted for 43.3% of the variance in first-semester college GPA ( $F[2, 26] = 10.709, p < .0001, R^2 = .433$ ). Table 3 shows the descriptive statistics and regression coefficients. Each of the predictor variables had significant

**TABLE 1. HIGH SCHOOL DATA PREDICTING FIRST-SEMESTER COLLEGE GPA (N = 59)**

Variable	Pearson r				$\beta$	b
	HON GPA	Col Red	ACT Eng	Sem 1 GPA		
Hon GPA		-.138	.358**	.427**	.25*	.723
Col Red			.319*	.499**	.35**	.243
ACT Eng				.553**	.35**	.066
					Intercept = -1.792	
Mean	3.77	2.49	21.5	2.95		
SD	0.33	1.34	4.95	0.93	$R^2 = .478^{**}$	

\* $p < .02$ , \*\* $p < .005$

**TABLE 2. HIGH SCHOOL DATA PREDICTING FIRST-SEMESTER COLLEGE GPA FOR AFRICAN AMERICAN STUDENTS (N = 29)**

Variable	Pearson r			$\beta$	b
	HON GPA	ACT Eng	Sem 1 GPA		
Hon GPA		.094	.388*	.25*	1.205
ACT Eng			.563**	.35**	.093
				Intercept = -3.608	
Mean	3.65	20.4	2.71		
SD	0.245	4.97	0.87	$R^2 = .430^{**}$	

\* $p < .02$ , \*\* $p < .001$



( $p < .02$ ) Pearson correlations with first-semester college GPA, with scores in the 0.38–0.46 range.

Research Question 2c was “What high school student variables predict GPA success in the first semester in college for Caucasian honors program students?” A stepwise regression analysis was done on the Caucasian honors program population ( $n = 14$ ). Despite a small population, the analysis revealed a two-predictor model (GSU Honors GPA, college readiness of the high school), statistically significant, that accounted for 47.8% of the variance in first-semester college GPA ( $F[2, 11] = 5.041, p = .02, R^2 = .478$ ). Table 4 shows the descriptive statistics and regression coefficients. Both predictor variables were statistically significant ( $p < .05$ ) at predicting first-semester GPA for Caucasian students.

Research Question 2d was “What high school student variables predict GPA success in the first semester in college for Hispanic honors program students?” A stepwise regression analysis was done on the Hispanic honors program population ( $n = 13$ ). With the small population, a stepwise

**TABLE 3. HIGH SCHOOL DATA PREDICTING FIRST-SEMESTER COLLEGE GPA FOR WHITE STUDENTS (N = 31)**

Variable	Pearson r			$\beta$	b
	HON GPA	Col Rdy	Sem 1 GPA		
Hon GPA		-.194	.377*	.48**	1.246
Col Rdy			.456**	.55**	.396
				Intercept = -2.827	
Mean	3.87	2.97	3.17		
SD	0.36	1.27	0.91	$R^2 = .433^{**}$	

\* $p < .02$ , \*\* $p < .01$

**TABLE 4. HIGH SCHOOL DATA PREDICTING FIRST-SEMESTER COLLEGE GPA FOR CAUCASIAN STUDENTS (N = 14)**

Variable	Pearson r			$\beta$	b
	HON GPA	Col Rdy	Sem 1 GPA		
Hon GPA		-.162	.480*	.48*	.923
Col Rdy			.413	.55*	.225
				Intercept = -0.781	
Mean	3.96	3.50	3.66		
SD	0.38	1.40	0.62	$R^2 = .478^*$	

\* $p < .05$

regression analysis exploring all combinations of the 13 high school variables revealed no significant predictor model for this group. The regression model that was closest to predicting significance was a two-predictor model (GSU Honors GPA, college readiness of the high school), similar to the predictor model for Caucasian students ( $F[2, 10] = 2.169, p = .16, R^2 = .303$ ).

## DISCUSSION

The purpose of this study was to use a regression analysis to find high school variables that predict first-semester college GPA for honors program students. Results suggested three predictor variables (GSU Honors GPA, ACT English, college readiness of the high school) accounting for over 47% of the variance of first-semester grades earned. When the data were disaggregated by ethnicity and race, regression results found two predictor models—one model for Black honors program students (GSU Honors GPA, ACT English) and one for White (Caucasian + Hispanic) and Caucasian-only populations (GSU Honors GPA, college readiness of the high school)—even with small sample sizes

### Common Predictors for the Aggregate Population

There are several meaningful conclusions from Research Question 1. One valuable finding is that key high school variables can predict nearly 50% of the variance in first-semester college GPA grades. The combination of GPA with the number of honors and AP classes completed, the ACT English score, and the college readiness of the high school provides an admissions approach that is holistic, quantitative, and predictive. A second reason that the results are noteworthy is that 77% of the sample studied was non-Caucasian; thus, this model can provide an admissions approach that works to maintain high GPA standards in honors programs with large minority populations while at the same time reducing barriers that standardized tests scores can create. Third, the variables found to be predictive of first-semester GPA in the GSU Honors Program are transferable and can be used by other honors programs. In the GSU Honors Program for fall 2016, the regression model was used as a tool to predict which first-year students would earn above or below a 3.0 GPA in the first semester. Of the 28 students in that cohort, the model correctly predicted a first-semester GPA above or below a 3.0 in 24 of 28 students (82% accuracy). Figure 1 is a scatterplot of the students' regression-adjusted predicted value (the prediction score resulting from the regression analysis)

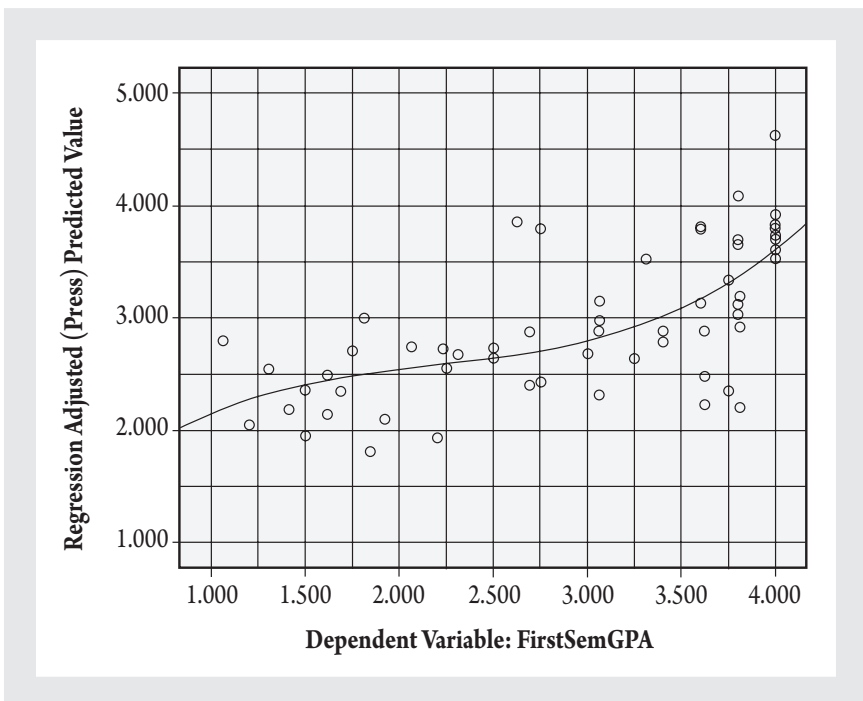
and the corresponding grade the students earned in the first semester. A cubic regression line ( $r^2 = 0.459$ ) is depicted. For example, a student earning a regression predicted value score of 3.10 would have a 50% probability of earning a 3.50 GPA in the first semester.

## Different Predictors for Different Ethnicities

Finding a predictive regression model for honors program students that serves high-minority populations was valuable in itself, but possibly even more significant was that the regression predictor variables changed when the data were disaggregated by ethnicity. College readiness of the high school was not predictive of first-semester GPA for African American students, and ACT English was not predictive of first-semester GPA for all White and Caucasian students.

*African American and Caucasian Students:* T-Test analysis revealed significant differences between the college readiness of high schools African Americans ( $m = 1.97$ ,  $SD = 1.25$ ) attended and those that Caucasians attended ( $m = 3.50$ ,  $SD = 1.40$ ;  $t[43] = -3.66$ ,  $p = .001$ ).

**FIGURE 1. SCATTERPLOT OF REGRESSION PREDICTED VALUE AND FIRST-SEMESTER COLLEGE GPA (N = 59)**



R2 Cubic = 0.459

The small variance in the college readiness of high schools attended by African Americans decreased the variable's predictive value for first-semester college GPA. The range of student scores (14 to 28) on the ACT English increased the scores' value in predicting first-semester college GPA.

Conversely, Caucasian honors students had more variability in the college readiness of the high school, with up to 75% college ready, in contrast to African American students who primarily attended schools where 30% or fewer of the students were deemed college ready. Also, most of the Caucasian ACT English scores ( $m = 25.0$ ,  $SD = 4.48$ ) were almost a full standard deviation above the average ACT English Score that predicted a 3.0 first-semester GPA for the whole sample of students ( $m = 21.5$ ). Thus, the ACT English score provided less predictability of first-semester GPA for Caucasian students.

While past research questioned the relevance of the SAT (Green & Kimbrough; Khé), results from this study suggest a predictive ability of standardized tests for first-semester college GPA when ACT scores are closer to the ACT's benchmark average for college readiness, as was the case with our African American students (ACT Composite  $m = 20.0$ ). The ACT was less predictive of first-semester college GPA when the cohort of students had ACT scores much higher than the score that predicted a 3.0 first-semester GPA, as was the case with our Caucasian students (ACT composite  $m = 24.6$ ). For Caucasian students, this study found that high school college readiness was a better predictor of first-semester college GPA.

*Hispanic Students:* While predictor variables for first-semester GPA were found for African American and Caucasian students, no predictor variables were found for Hispanic students. One reason was the small population of Hispanic students included in the sample. Another reason is that this population consistently had averages for GSU Honors GPA, high school college readiness, and ACT English scores that were higher than African Americans but lower than Caucasian students. For this population, a larger sample is needed to know if predictive data are more similar to Caucasian students, African American students, or neither ethnic group.

## Implications for Admissions Decisions

Using regression modeling for admissions with these variables deemphasizes the need for high standardized test scores, which have been found to be a barrier to minority involvement in honors programs (McKay). The result is a sliding-scale approach to admissions decisions, making them more personalized to individual students and their high school educational experiences.

With this modeling, the predictive variables examined here could provide enough predictability of college GPA to render standardized test scores unnecessary. Universities with missions to serve underserved populations or increase diversity in their honors program can use this regression model with minimal risk of admitting students who would not be well-served by an honors program experience.

## Study Limitations

While the study was able to find significant predictor variables for all ethnicities in aggregate and some ethnicities when the data were disaggregated, the study suffered from a small population of White students. A larger sample of Hispanic students is needed to identify significant predictors, and a larger sample of Caucasians would work to solidify the important predictors found among this population. The short duration of the study is also a limitation: I am reporting three years of data, and every semester the data analysis has been done, the percentage of variance accounted for in each regression model has increased, so with more participants the proportion of variance accounted for by the predictor variables might grow.

## CONCLUSION

At a state regional comprehensive university with a mission to serve underserved populations, merely having a high GPA and standardized test score in line with sister public institutions as an admission requirement would create barriers to honors program participation for minority students. In fact, using typical honors program standards would have made having a four-year honors program at our institution nearly impossible. This regression model provides a tool to ensure an admission standard where our students will be well-served by the honors program without creating barriers to participation in high-minority populations. Future research should explore if the variable predicting first-semester success in this study can also predict GPA success in later years and outcomes like program completion.

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