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Factors Affecting Graduation with Honors: A Case Study in Bumpers College

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Factors Affecting Graduation with Honors: A Case Study in Bumpers College

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By

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Abstract

This study aims to understand the factors influencing the graduation rate with honors in the Dale Bumpers College of Agricultural, Food, and Life Sciences (Bumpers College) at the University of Arkansas Fayetteville (UAF). Utilizing data from 2004 to 2014 provided by the Office of Strategic Analytics & Insights at UAF, this research investigates several demographic and academic variables to potentially identify predictors of successfully graduating from the Bumpers Honors Program. The methodology involved cleaning the data, statistical analyses including T-test and Chi-square tests, and logit regression models to determine significant factors impacting graduating with honors.

After chi-square and t-tests and seven iterations of logit models, three factors were found to significantly increase a Bumpers College student's chances of graduating with honors: remaining in Bumpers College through their entire college career, ACT score, and third term GPA in college. The results provide valuable insight for Bumpers College administrators to better adapt interactions and incentives aimed to enhance the graduation rates of incoming freshmen from the honors college. Future research could incorporate additional factors, such as student engagement and funding for high-impact programs, to better refine the model and predict honors success.

Introduction and Background

Until this point, various studies have researched the diverse factors associated with predicting the successful completion of honors programs, along the way offering valuable insights into the academic journey of incoming freshmen. Notably, these factors encompass high school GPA (Diaz, Farrugia, Wellman & Bottoms, 2019; Bowman & Culver, 2019), ACT/SAT scores (McKay, 2009; Clark et al., 2019), accumulated AP credits (Fechheimer, Webber & Kleiber, 2017), ethnicity (McKay, 2009), gender (Dinan, 2016), financial need (Campbell & Fuqua, 2008), first-generation status (Keller & Lacy, 2013), in/out-of-state residency (Keller & Lacy, 2013), and first-semester college GPA (Campbell & Fuqua, 2008). Some research has found a strong correlation between high school GPA and the completion of honor programs (Savage, Raehsler, and Fiedor 2014). Among most studies, the consensus suggests that higher ACT/SAT scores, a greater number of AP credits, and a stronger first-semester performance in college GPA increases the likelihood of graduating with honors (McKay, 2009; Clark et al., 2019; Fechheimer, Webber & Kleiber, 2017), The data have shown that first-generation students, individuals from non-white backgrounds, and those with financial needs often see adverse challenges when working towards honor completion (McKay, 2009). Notably, studies examining gender and residency status have yielded mixed results (Dinan, 2016).

The UAF Honors College consists of six different honors programs correlating to the six different colleges on campus, each honors program is structured differently requiring different criteria to be eligible. Two studies have examined honors graduation at the University of Arkansas Fayetteville (UAF). The recent study conducted by Bateman (2021) focused on the entire UAF Honors College. The research encompassed all majors and the six different honors programs. This research identified key factors that emerged as significant predictors of successful completion of

any of the six honors programs. These factors included the students' GPA in their first term, their initial and final choices of colleges, ACT scores, and financial needs (Bateman 2021). Litzinger (2022) followed by using a subset of the data to examine the completion of the Honors Program in the Walton College of Business. The finding included four main factors high school GPA, ACT/SAT scores, number of AP credits, and first-semester performance that influenced the completion of the Walton Honors Program at UAF (Litzinger 2022). Because honor requirements differ by Honors Program on campus, my research becomes important because it provides insight into the factors that impact the completion of honors within Bumpers College specifically and thus further breaks down the research presented by Bateman.

My study aims to fill the gap between current knowledge and potential factors that impact the honors graduation rate of incoming freshman students in the Dale Bumpers College of Agricultural Food and Life Sciences (Bumpers College). Following the completion of my research, the results will help determine effective interventions and incentives that could be taken by Bumpers College to improve the retention rate and increase the likelihood of students graduating with honors from Bumpers College.

Methods

Throughout this section, I will describe my methods in three subcategories: data collection and management, statistical analysis, and logistic regression analysis.

Data Collection and Management

The data set for this research came from the Office of Strategic Analytics & Insights at the UAF. Throughout this fall semester, my mentor and I cleaned the data to only include students who joined the Bumpers Honors Program as incoming freshmen and have had sufficient time to graduate from the University of Arkansas (which is defined as six years). Therefore, my data set

only includes information on Bumpers College freshmen which started between the years 2004 and 2014 (as the graduation data in my particular dataset are only available through Fall 2020). Each row of data relates to a unique student, for that reason I have assigned a number at random to keep track of each student as no names or student IDs are included in the dataset.

In Table 1, the variables originally included in the data set are *Gender*, Ethnicity (*Two or More, American Indian, Hispanic, Caucasian, Asian, African American), First Generation* Student, *Arkansas* Resident, *Pell* Grant Recipient, *Stafford* Loan Recipient, *Unmet* Financial Need, *High School GPA*, *ACT* scores, Number of *AP Credits*, Number of *AP Courses* Taken, *GPA First Term, GPA Second Term, GPA Third Term,* and *Honors Grad.*

While working with the data set, I also created new variables in hopes of better explaining the completion rate of the Bumpers Honors Program among graduates. First, by looking at the length of time it took the student to graduate from the University of Arkansas regardless of whether graduating with honors or without. I created two new variables called *"Grad 4 Years*" and *"Grad 6 Years"* where the data was broken down to students who completed their degree within four years, and students who graduated within 6 years from UAF. The value of the new variable for each was a "1" if the student graduated within the respective time frame of the variable and a "0" if they did not. I also considered whether the student graduated from the same college compared to the college the student attended as an incoming freshman. In this case, the new variable was called "*Same College"* and the student that remained in the same college while at the university received a value of "1" for the variable and "0" if they switched during their time at the University of Arkansas. Because the variables listed above are outcome variables they are not viewed in terms of statistical analysis and are not happening during the academic career to influence graduating with honors in this study.

Statistical Analysis

In this study, I used statistics in three ways. First summary statistics were run using SAS. The "proc freq" command was used by my mentor in SAS to provide a total count for all variables in the dataset. Then the "proc means" command was used to find the means for the continuous variables as well as their minimum, maximum, and standard deviation. The standard deviation is the measure of variation given the expected impact of a variable on the mean and looks to see the dispersion of data from the mean *(Hess & Hess, 2017).* These frequencies are vital for understanding the dataset's variation which is crucial for subsequent statistical analysis. Some of the variables, particularly those dealing with ethnicity had a limited sample size due to the lack of diversity. Of the students that graduated from Bumpers College with honors 93.66% of them identified as white, leaving less than 8% of the sample size to different ethnic groups.

The second type of statistical analysis performed with the data set was the Chi-Square test. A chi-square test is defined as the difference between observed and expected values within a contingency table. It tests the levels of independence along with providing the distribution of variables (Hess & Hess, 2017). Individual chi-squares were used to test the relationship between graduating with honors (*Honors Grad*) and 12 variables (from *Gender* to *Same College*) listed in Table 1. Significant differences are said to exist if the P-value is less than or equal to 0.05 ($P \leq 0.05$)

The third type of statistical analysis performed was t-tests. A t-test is a statistical method used to test the mean of normally distributed data when the standard deviation is unknown (Britannica, 2023). T-tests were used to test relationships between graduating with honors (*Honors Grad*) and 8 variables ranging from *Unmet Need* to *GPA First Term* in Table 1. Significant indications are said to exist if the Probability (Pr) is less than or equal to 0.05 ($Pr \leq 0.05$).

Logistic Regression Analysis

Following this, I worked with my mentor on logit regression models. Logit models are employed to assess the relationship between a dependent variable (in this case, graduating with honors, *Honors Grad*) and independent variables that are continuous numbers (such as *High School GPA*, ACT, etc.) (Science Direct, 2021). Based on the literature and previous studies completed at UAF, I expected before beginning my statistical analyses that the initial form of the logit model would be: Graduating with honors = f (*Gender, Two or more ethnicities, American Indian, Hispanic, Caucasian, Asian, African American, First Gen, Arkansas, Pell, Stafford, Unmet Need, HSGPA, ACT, AP Credits, AP Courses, GPA 1st Term, GPA 2nd Term, GPA 3rd Term,* and *Same College*) I did not include the variables *(Same Major, Grad 4 Years, Grad 6 Years, Honors Grad)* because the variables represent outcomes of the data and are not factors which influence whether or not students graduate with honors.

Instead, the initial form of the logit model included the variables that were significant in my T-tests and Chi-square tests. I then removed insignificant variables until the model had the best fit. Next, I calculated the marginal effects which are explained more in the results section.

Results

Data Characteristics

This research utilizes data from the Bumpers College honors program from 2004 to 2014 and includes students who were enrolled in honors as a freshman. Important demographics are presented using the "proc means" results in Table 2. To better explain the data, it's important to understand the breakdown and percentages of each characteristic evaluated in this research. For the categorical data, the values are either 0 or 1. A "1" counts the demographic being analyzed.

Therefore, the mean represents the percentage of the responding population that meets that demographic. For the continuous variables like ACT, the mean in Table 2 represents the actual mean of that variable in the dataset.

In looking into the gender demographic, the sizable disparity between the completion of males and females in the Bumpers Honor Program becomes apparent. Of the 220 students that graduated with honors between 2004 to 2014 only 24.89% or 55 of those students identified themselves as male. Ethnicity in the Bumpers Honors Program is another demographic that experiences extreme disparity. The ethnicity with the most representation is *Caucasian* making up 93.67% or 207 out of the 221 students recorded in the results leaving *Two or More* ethnicities at 2.71%, *American Indian* at 2.71%, *Hispanic* at 3.17%, *Asian* at 1.81%, and *African American* at 0.90%.

The next set of variables included is also explained using the mean as a percent of the total data results which include first-generation, financial aid, state residency, honors graduate, and the same college variable. Of the 216 respondents who graduated and answered each demographic question in the Bumpers Honors Program 19.44% or 42 students are identified as the first generation to attend college. Arkansas residents make up 67.87% of the students included within the data set. Respectively 13.12% of admitted students receive Pell Grants, with a total of 25.34% qualifying for subsidized Stafford Loans. Of the 221 students included in the data 56.11% or 124 remained in Bumpers College throughout their time at the University of Arkansas. For the variables *Grad 4 Years* 66.52% of students met this requirement and 85.07% of students met the requirements of *Grad 6 Years*. A key factor in the data is that only 33.93% or

75 of students who joined Bumpers Honors as freshmen from 2003 to 2015 completed the Bumpers Honors Program before graduating from or just leaving the university.

The remaining variables in Table 2 are continuous, and therefore the mean value represents the actual mean number for each variable. The average HSPGA for the data set is 3.9983, with a mean admission ACT score of 30.29. The average number of AP Courses taken as incoming freshmen in the Bumpers Honors Program is 2.23 courses, and 6.46 AP Credits transferring into the university. While in college at the university GPA in the first term averaged 3.6404, second term was 3.6405, and the mean third term GPA at the University of Arkansas for Bumpers Honors Students was 3.6050. The average time it took students to graduate from the university whether honors graduate or not was 4.15 years.

Chi-Square Results

Chi-square results are presented in Table 3. These results reveal that there are limited significant differences between those who graduated with honors and those who did not. Only two of the categorical variables in the research proved to be significantly different between honors and non-honors graduates. The first significant (P=0.0315) is *Same College.* According to the research, 40% of students who remained in Bumpers throughout college graduated with honors compared to the 26% who changed colleges while at UAF. The results of the Chi-square test also suggest a significant difference (P=0.0032) in graduating with and without honors for Subsidized Stafford Loan students. Only 18% of the students who received the Stafford Loan graduated with honors. A noticeable distinction is that the Chi-square test shows that Pell Grant recipients which are generally defined as those in higher financial need than those receiving the Stafford Loan are not significant in determining graduation rates of honors students. This is a key

distinction between Pell Grants and Stafford Loans and highlights the disparities between the income and socioeconomic status of students attending the University of Arkansas. Students who receive loans may be motivated to complete the honors program through the financial responsibility of loans. Lastly, ethnicity was not found in the research to be a significant indicator of honors graduation in the Bumpers College honors program. With ethnicity not found to be a significant indicator it is in part because 94% of students included in the study identified themselves as Caucasian leaving little representation of other ethnicities due to the nature of majors included in Bumpers College. Chi-Square tests were not run on the outcome variables (such as Grad 4 Years and Grad 6 Years) as the purpose of the Chi-Square tests was to look for significant differences in variables that could impact the outcome of graduating with honors or not.

T-Test Results

There are significant differences in the continuous variables between those who graduated with honors and those who did not. The results are presented below in Table 4. The variables *HSGPA, ACT, AP Courses, AP Credits,* and *GPA First Term* are found to be significantly different between those who graduated with honors and others. For each variable, the mean is higher for those who graduated with honors compared to those who did not. For example, the average high school GPA for honor graduates was 4.0631 compared to 3.9648 for non-honors. ACT scores for those who graduated with honors were on average 31.03 and 29.92 for students who graduated without honors. The four variables with the greatest level of significance for honors graduation are *ACT* scores with a mean of 31.0267, *GPA First Term* of

3.8486, *GPA Second Term* being 3.8638, and *GPA Third Term* with a mean of 3.8409. The only factor that did not prove significant in the T-test is *Unmet Need*.

Logit Model

When entering the research, the initial hypothesis regarding factors that influenced graduating with honors was developed by starting with factors that the literature suggested would be significant and then refining that list by using that list of variables found to be significant through running statistical tests such as the T-test and Chi-square test. Therefore, based on the literature, and then the results of the Chi-square tests and T-tests, the initial logit regression model was graduating with honors = f (*Stafford, HSGPA, ACT, AP Courses, GPA 1st Term, GPA 2nd Term, GPA 3rd Term, Same College).*

The results of the initial logit model are presented in Table 5. In this first estimation of the logit model, there were a large number of insignificant variables in the results. Table 6 provides the Model Fit Summary for the initial logit regression. The Akaike Information Criterion (AIC), Schwarz Criterion, and log-likelihood are all measures to test the fit of data to a particular model. The log-likelihood for the logit regression represents the model fit for a particular dataset. The higher the value for the log-likelihood means the model better fits the dataset (*How to Interpret Log-Likelihood Values,* 2021). AIC is found for regression using the parameters and log-likelihood, while the numeric values are not useful in quantifying how well the data fits the model with the lowest AIC can be interpreted as the best fit (*What is Considered a Good AIC Value,* 2021). The Schwarz Criterion also compares the log-likelihood to the number of parameters to determine the statistical fit of the dataset based on the lowest Schwarz value from the models (Sewell, n.d.). These fit statistics were also used as a baseline to compare the

future estimates of the logit model. I wanted to make sure my final model had not only statistically significant variables but also improved fit based on the AIC, Schwarz, and Log Likelihood. In this case, the log-likelihood did not increase but the outcome for AIC and Schwarz Criterion offset this.

Multiple revisions to the logit model were made. Insignificant variables were removed one by one until the only variables that remained were significant and moved most of the fit statistics values in the right direction. The final logit regression was graduating with honors = f (*ACT, GPA 3rd Term, Same College).*

The final logit regression is presented in Table 7. In understanding and interpreting the impact of variables in the logit regression we must only look at the sign associated with the coefficient (whether positive or negative) instead of interpreting the size of the coefficient. The significant variables from the final logit regression *ACT, GPA 3rd Term,* and *Same College* all have positive coefficients or a positive impact on students graduating with honors from the Bumpers Honors Program. The Model Fit Summary for the final logit regression is provided in Table 8. Through the result of removing variables until we reached the final logit regression the Log Likelihood did not increase but the AIC and Schwarz Criterion decreased as expected.

The interpretations for the variables included in the final logit regression are as follows:

- For every 1-point increase in ACT scores of incoming freshmen, the student is 3.90% more likely to graduate with honors.
- For every 1-point increase in third-term GPA at the University of Arkansas, a student is 68.32% more likely to graduate with honors. Additionally, this means for every 0.10-point increase in third-term GPA a student is 6.83% more likely to graduate from the Bumpers Honors Program.

- If a student remains in the same college (Bumpers College), that student is 12.97% more likely to graduate with honors. (Table 9)

The variable with the largest impact on graduating with honors is the third-term GPA at the University of Arkansas. Every 1-point increase in third-term GPA increases the likelihood of graduation with honors four times the sum of the *Same College* and *ACT* scores. This proves to be a major indicator of students who will go on to graduation from the University of Arkansas as an honors graduate.

Limitations and Recommendations for Future Study

While this research fully utilized the data set available, the data set from which this research was based does have limitations. The largest limitation in the data set is the time frame from which the data is included. This research relies on data representing incoming Bumpers College honors students from 2004 to 2014. The most updated data would include three more years of entering students, 2015-2017 (based on graduation data through 2023). Another limitation of the data set is that it does not include data during or after the Covid-19 pandemic. The pandemic has drastically changed how people communicate and function and the earliest form of this data will not be available until 2026, and even then, we might not have a clear understanding of the impact Covid-19 had on academia and students engaging and graduating with honors. This means that while the data used in this thesis give us a good idea of factors that influenced graduating from honors in Bumpers College in the years 2004-2014 in the Honors College, it may or may not reflect the current factors that impact students' ability to complete the program.

The lack of variables also remains a limitation of the data set. There are missing variables that help explain student involvement and engagement along with the college's investments made toward a student's education. I hypothesize that students who receive study abroad grants and/or research funding from the honors college graduate with honors at a higher rate than students who do not receive funding for high-impact programs due to the perceived personal investment the honors college is making in that student. The recommendation moving forward is to include funding for high-impact programs to better understand the impact and marginal effects of the variables on graduating with honors from Bumpers Honors College. The limited sample size for certain variables such as ethnicity also caused statistical models for these variables to be excluded due to the fact it was not able to run statistical tests.

Many other factors could impact the honors graduation rate from the Bumpers Honors Program. The data set is also limited based on factors that cannot be measured or recorded by the university while attending the University of Arkansas. Factors such as employment while in college, quality of mentor, and Bumpers Honors Program engagement may also have the potential to impact graduating with honors, however, this information was not attainable or measurable with the data set the research was based on. Moving forward research might choose to include factors not covered in this study.

Summary and Conclusion

Through this study, I set out to develop a deeper understanding of the factors that affected honors graduation within the Bumpers Honors Program. Previous studies looked at the graduation rate of honors programs along with business honors programs, but limited literature existed on Agriculture, Food, and Life Science colleges. Through my research, I was able to

determine factors that proved to have a significant impact on graduating with honors from the Bumpers Honors Program. The research included data provided by the University of Arkansas Office of Strategic Analytics & Insights from 2004-2014. The variables were tested for significance using a T-test for variables with numeric variables and a Chi-Square Test for nominal variables. Taking the significant variables, I constructed a logit regression model to concur the factors that had the largest impact on graduating with honors. The initial hypothesis constructed using significant variables was graduating with honors = f (*Stafford, HSGPA, ACT, AP Courses, GPA 1st Term, GPA 2nd Term, GPA 3rd Term,* and *Same College*).

While there are limitations to the data set such as sample size for certain variables the University of Arkansas measured factors in which the research was able to identify three variables *Same College, ACT,* and *3rd Term GPA* that had the most significant impact on honors graduation rates within Bumpers Honors Program. With GPA 3rd term having the most significant impact on honors completion within the program, it is important to note that during the timeframe of the dataset, each college honors program had different GPA requirements. Based on the results of the research it can be inferred that the Bumpers Honors Program needs to focus on the student's academic performance through GPA criteria, remain focused on college retention, and consider the student's ACT score as an incoming freshman. Moving forward the Honors College and the University of Arkansas should track students' involvement and engagement through scholarships, study abroad, and research grants. Bumpers Honors Program should also focus on recruiting students who identify as male too, in turn, limit the gender disparity between males and females graduating with honors. In interpreting the results, it is important to understand this data only reflects incoming freshmen who had been accepted into

the Bumpers Honors Program and excludes any data from students who might have joined while attending the University.

References

Bateman, B. (2021). An Analysis of the Factors that Influence Success Rates of Honors College Students. *Agricultural Economics and Agribusiness Undergraduate Honors Theses* Retrieved from https://scholarworks.uark.edu/aeabuht/22

Bowman, N. A., & Culver, K.C. (2018) When Do Honors Programs Make the Grade? Conditional Effects on College Satisfaction, Achievement, Retention, and Graduation. *Research in Higher Education, 59(3),* 249-272.

Britannica, T. Editors of Encyclopedia (2023, December 8). Student's t-test. Encyclopedia Britannica. https://www.britannica.com/science/Students-t-test

Campbell, K. C. & Fuqua, D. R. (2008) Factors Predictive of Student Completion in a Collegiate Honors Program. *Journal of College Student Retention: Research, Theory and Practice. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.906.8172&rep=rep1&type=pdf*

Clark, C., Schwitzer, A., Paredes, T., & Grothaus, T. (2018) Honors College Students' Adjustment Factors and Academic Success: Advising Implications. *NACADA Journal, 38(2),* 20-30.

Diaz, D., Farruggia, S. P., Wellman, M. E., & Bottoms, B. L. (2019). Honors Education Has a Positive Effect on College Student Success. DigitalCommons@University of Nebraska - Lincoln.

Dinan, S. E. (2016). How gender differences shape student success in honors. *Journal of the National Collegiate Honors Council, 17*(1), 289.

Fechheimer, M., Webber, K., & Kleiber, P. B. (2011). How well do undergraduate research programs promote engagement and success of students? *CBE life sciences education*, *10*(2), 156–163. https://doi.org/10.1187/cbe.10-10-0130

Goodstein, L., & Patricia, S. (2013). They come but do they finish? program completion for honors students at a major public university, 1998-2010. *Journal of the National Collegiate Honors Council, 14*(2), 85.

Hess, A. S., & Hess, J. R. (2017). Understanding tests of the association of categorical variables: the Pearson chi-square test and Fisher's exact test. Transfusion (Philadelphia, Pa.), 57(4), 877–879. https://doi.org/10.1111/trf.14057

Keller, R.R. & Lacy, M.G. (2013) Propensity Score Analysis of an Honors Program's Contribution to Students' Retention and Graduation Outcomes. *Journal of the National Collegiate Honors Council – Online Archive,* 397*,* 80-82. Retrieved from http://digitalcommons.unl.edu/nchcjournal/397

Litzinger, W. (2022). Factors Affecting Graduation with Honors: A Case Study in Business. *Agricultural Economics and Agribusiness Undergraduate Honors Theses* Retrieved from https://scholarworks.uark.edu/aeabuht/25

McKay, K. (2009) Predicting Retention in Honors Programs. *Journal of the National Collegiate Honors Council – Online Archive,* 253. 77-85. Retrieved from http://digitalcommons.unl.edu/nchcjournal/253

Office of Institutional Research and Assessment (OIRA), University of Arkansas (2020). Fall 2020 11th Day Enrollment Report. https://oir.uark.edu/students/enrollment-reports/2020-fall-summary.pdf

Savage, H., Raehsler, R. D., & Fiedor, J. (2014). An Empirical Analysis of Factors Affecting Honors Program Completion Rates, 115–128.

Science Direct. 2021. Logit Model – an Overview. Science Direct Topics. https://www.sciencedirect.com/topics/economics-econometrics-and-finance/logitmodel/pdf

Sewell, M. (n.d.). *Bayesian information criterion (BIC) (also called the Schwarz Criterion)*. Schwarz's Criterion. http://www.modelselection.org/bic/

Zach. (2021, August 21). *How to Interpret Log-Likelihood Values*. Statology. https://www.statology.org/interpret-log-likelihood/#:~:text=The%20log-likelihood%20value%20of%20a%20regression%20model%20is,can%20range%20from%20negative%20infinity%20to%20positive%20infinity.

Zach. (2021b, August 21). *How to Interpret Log-Likelihood Values*. Statology. https://www.statology.org/interpret-log-likelihood/#:~:text=The%20log-

likelihood%20value%20of%20a%20regression%20model%20is,can%20range%20from%20negative%20infinity%20to%20positive%20infinity.

Table 1. Factors Examined in this Study

Variable	
Gender	Male or female (Male=1)
Two or More	Two or more ethnicities
American Indian	American Indian ethnicity
Hispanic	Hispanic ethnicity
Caucasian	Caucasian ethnicity
Asian	Asian ethnicity
African American	African American ethnicity
First Gen	First generation college student
Arkansan	Student's home state is Arkansas
Pell	Student received a Pell Grant for financial needs status
Stafford	Student received a Stafford Loan for financial need status
Unmet Need	The amount of money needed to cover cost of attendance
HSGPA	High school grade point average
ACT	ACT score in high school
AP Credits	Number of AP Credits student brought into UofA
AP Courses	Number of AP Courses taken in high school
GPA First Term	First semester GPA at UofA
GPA Second Term	Second semester GPA at UofA
GPA Third Term	Third semester GPA at UofA
Same College	Whether the student stayed in Bumpers College all 4 years of college
Grad 4 Years	Whether the student graduated in 4 years
Grad 6 Years	Whether the student graduated in 6 years
Honors Grad	Whether the student graduated with honors or not

Table 2. Demographic Statistics

Variable	Number	Mean	Std Dev	Minimum	Maximum
Gender (1=M)	220	0.2488688	0.4333391	0	1
Two or More (1=Yes)	221	0.0271493	0.1628874	0	1
American Indian (1=Yes)	221	0.0271493	0.1628874	0	1
Hispanic (1=Yes)	221	0.0316742	0.1755288	0	1
Caucasian (1=Yes)	221	0.9366516	0.2441416	0	1
Asian (1=Yes)	221	0.0180995	0.1336141	0	1
African American (1=Yes)	221	0.0090498	0.0949138	0	1
First Gen (1=Yes)	216	0.1944444	0.3966917	0	1
Arkansan (1=Yes)	221	0.678733	0.4680231	0	1
Pell (1=Yes)	221	0.1312217	0.3384092	0	1
Stafford (1=Yes)	221	0.2533937	0.4359418	0	1
Unmet Need	221	3092.41	5548.6	0	24124
HSGPA	220	3.9982727	0.2143247	3.29	4.6
ACT	221	30.294118	2.0089373	25	36
AP Courses	221	2.2262443	2.9562628	0	15
AP Credits	221	6.4660633	8.3782715	0	43
Honors Grad (1=Yes)	221	0.3393665	0.4745692	0	1
GPA First Term	221	3.6404208	0.4832159	0.143	4
GPA Second Term	221	3.6405249	0.4733872	0.143	4
GPA Third Term	221	3.6049910	0.4701635	0.1430	4
Yrs Grad	193	4.1520725	0.6164379	3.00000	7.25000
Grad 4 Years (1=Yes)	221	0.6651584	0.4730064	0	1
Grad 6 Years (1=Yes)	221	0.8506787	0.357214	0	1
Same College (1=Yes)	221	0.561086	0.497381	0	1

Table 3. Chi-Squared Test Results

Factor	Graduated Without Honors		Graduated With Honors		P-Value	Number of Observations	Missing Observations
	No	Yes	No	Yes			
Gender	64.46	70.91	35.54	29.09	.4154	221	0
Two or More Ethnicities	66.05	66.67	33.95	33.33	1.000	221	0
American Indian	66.05	66.67	33.95	33.33	1.000	221	0
Hispanic	66.36	57.14	33.64	42.86	0.6916	221	0
Caucasian	64.29	66.18	35.71	33.82	1.00	221	0
Asian	65.90	75.00	34.10	25.00	1.00	221	0
African American	144	2	75	0	0.5496	221	0
First Gen	67.82	32.18	59.52	40.48	0.3639	216	5
Arkansan	64.79	35.21	66.67	33.33	0.8792	221	0
Pell	64.58	35.42	75.86	24.14	0.2947	221	0
Stafford	60.61	39.39	82.14	17.86	0.0032	221	0
Same College	74.23	59.68	25.77	40.32	0.0315	221	0

Table 4. T-Test Results

Factor	Graduated Without Honors			Graduated With Honors			Degrees of Freedom	T-Value	Pr>[t]
	Number	Mean	Std Dev	Number	Mean	Std Dev			
Unmet Need	146	3370.3	5718.6	75	2551.50	5196.2	219	1.04	0.3000
HS GPA	145	3.9648	0.2112	75	4.0631	0.2065	218	-3.30	0.0011
ACT	146	29.9178	1.9280	75	31.0267	1.9726	219	-4.02	<0.0001
AP Courses	146	1.7329	2.7750	75	3.1867	3.0787	219	-3.55	<0.0005
AP Credits	146	4.9726	7.7637	75	9.3733	8.81	219	-3.81	0.0002
GPA First Term	146	3.35335	0.5469	75	3.8486	0.2039	204.71	-6.18	<0.0001
GPA Second term	146	3.5258	0.5338	75	3.8638	0.1771	196.15	-6.94	<0.0001
GPA Third Term	146	3.4838	0.5234	75	3.8409	0.1873	201.75	-7.38	<0.0001

Table 5. Initial Logit Results

Parameter	DF	Estimate	Standard Error	T Value	Approx Pr>[t]
Intercept	1	-22.523196	4.788707	-4.70	<.0001
Stafford	1	0.274903	0.451316	0.61	0.5424
Stafford	0	0	.	.	.
Same College	1	-0.720698	0.349586	-2.06	0.0392
Same College	0	0	.	.	.
HSPGA	1	0.091701	0.962091	0.10	0.9241
ACT	1	0.200290	0.102057	1.96	0.0497
AP Courses	1	0.066417	0.060478	1.10	0.2721
GPA First Term	1	-1.984386	1.408950	-1.41	0.1590
GPA Second Term	1	2.626055	2.518453	1.04	0.2971
GPA Third Term	1	3.455630	2.017509	1.71	0.0867

Table 6. Initial Test Resolute

Model Fit Summary	Values
Number of Endogenous Variables	1
Endogenous Variable	Honors Grad
Number of Observations	220
Missing Values	1
Log Likelihood	-107.58584
Maximum Absolute Gradient	2.14486E-7
Optimization Method	Quasi-Newton
AIC	233.17167
Schwarz Criterion	263.71432

Table 7. Reduced Logit Results

Parameter	DF	Estimate	Standard Error	T Value	Approx Pr>[t]
Intercept	1	-23.473623	3.981685	-5.90	<.0001
Same College	1	0.776752	0.341081	2.28	0.0228
ACT	1	0.233400	0.087386	2.67	0.0075
GPA Third Term	1	4.091347	0.791188	5.17	<.0001

Table 8. Final Test Resolute

Model Fit Summary	Values
Number of Endogenous Variables	1
Endogenous Variable	Honors Grad
Number of Observations	221
Missing Values	0
Log Likelihood	-109.84678
Maximum Absolute Gradient	7.86811E-6
Optimization Method	Quasi-Newton
AIC	227.69357
Schwarz Criterion	241.28622

Table 9. Marginal Effects on Each Variable

Variable	Marginal Effects
Same College	0.1297164
ACT	0.0389775
GPA Third Term	0.6832482