

Attachment 25

“Undeclared Versus Declared: Who is More Likely to Graduate?”

An article by David Spight

From the Journal of College Student Retention:
Research, Theory & Practice, 2019

UGS Program Review
Fall 2019



The University of Texas at Austin
School of Undergraduate Studies

Undeclared Versus Declared: Who Is More Likely to Graduate?

Journal of College Student Retention:
Research, Theory & Practice
0(0) 1–20

© The Author(s) 2019

Article reuse guidelines:

sagepub.com/journals-permissions

DOI: 10.1177/1521025119879881

journals.sagepub.com/home/csr



David B. Spight¹ 

Abstract

Increasing graduation rates continues to be a high priority for administrators at many institutions of higher education. With longitudinal data from a large research university in the Western United States, the purpose of this study was to examine the potential relationship between matriculating with or without a major declared and degree completion. There exists a perception that an early decision about a major is an integral step in ensuring students graduate. Previous research about undeclared students and degree completion, however, is lacking and dated. Conceptually framed within Astin's (1993) input–environment–output model, logistic regression analyses were conducted using institutional records for the Fall 2010 cohort of 4,489 full-time enrolled, first time in college students. Matriculating as undeclared versus declared was not found to increase, or decrease, the likelihood of graduating in 4 years. With 6-year rates, however, undeclared students were more likely to graduate.

Keywords

major, degree completion, undecided, undeclared

Introduction

Institutions of higher education continue to face pressures and expectations to improve graduation rates (A. S. Horn & Lee, 2016; Miller, 2014). Institutional degree completion rates are often considered as reflective of institutional

College of Education, University of Alabama, Tuscaloosa, AL, USA

Corresponding Author:

David B. Spight, University of California, One Shields Avenue, Davis, CA 95616, USA.

Email: dbspight@gmail.com

performance (Dougherty et al., 2016) and commonly a factor in determining institutional financial support (Center for American Progress, 2012). In some states for example, institutions that meet the specific performance targets receive a greater allocation of state funding support than institutions that do not meet targets (Dougherty & Reddy, 2013; Tandberg & Hillman, 2014). As a result, increasing degree completion rates are an important priority for colleges and universities (Gansemer-Topf & Schuh, 2006; National Commission on Higher Education Attainment, 2013).

Students, and their families, are interested in higher education leading to employment-based outcomes (Mayhew et al., 2016). Understandably so, as students who graduate are more likely to gain employment, earn higher salaries, and contribute to the economy (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011; Mayhew et al., 2016). For students who leave prior to completion, career opportunities are often limited, projected earnings are lower (Tinto, 2012), and the likelihood of defaulting on student loans is substantially higher (Casselmann, 2012). As a result, increasing graduation rates is not only a priority for the financial stability of an institution but also important as an engine for social mobility. Therefore, it becomes important for institutional leaders to understand the reasons why students fail to complete a degree.

When considering graduation, scholars have examined potential factors including, but not limited to demographic characteristics of students such as race, gender, and ethnicity (Bailey, Calcagno, Jenkins, Leinbach, & Kienzl, 2006; Leppel, 2001; Munoz & Maldonado, 2012); student engagement (Barnes & Piland, 2011; L. Horn & Carroll, 2006; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008) and student integration into the academic environment (Tinto, 1993); socioeconomic status (Adelman, 2006; Berkner, He, & Cataldi, 2002; Choy, 2002); and precollege academic achievement as reflected by participation in dual enrollment coursework while in high school (D'Amico, Morgan, Robertson, & Rivers, 2013). There is, however, one factor that is often overlooked in recent research: early declaration of a college major. Significant numbers of college students enroll in college each fall undeclared (Gordon & Steele, 2015). Many perceive starting undecided as indicative that a student may be at risk of attrition (Allen & Robbins, 2008; Mangan, 2011; Onink, 2010; Simon, 2012). Students who declare early, in contrast, are viewed as more likely to graduate and graduate on time (DesJardins, Kim, & Rzonca, 2003; Leppel, 2001). In response to this widely held perception of undeclared students as at-risk, many institutions have placed heavy emphases, sometimes even requiring students, to declare a major and declare a major early. This institutional practice reinforces the negative perception of matriculating as undeclared, suggesting that undeclared students take circuitous, and time-consuming, paths from entry to degree completion to career. This belief that an early declaration of major is necessary for success is also reflected in institutional actions. For example, many community

colleges have implemented Bailey, Jaggars, and Jenkins'(2015) "*Guided Pathways*" model which aims to simplify the number of educational choices available to students and the pathways to completing those limited major choices, with the belief that giving students time to explore from a large number of complexed choices, may result in students taking too long to find a major and complete a degree.

There is, however, no consensus among the research findings about whether starting college with a major increases the likelihood a student completes a degree (Gordon & Steele, 2015; Lewallen, 1995). In addition, an early declaration of major may not be indicative of a fully crystalized decision as each year substantial numbers of students change their major (Foote, 1980; Kramer, Higley, & Olson, 1994; Lewallen, 1992; The University of Texas at Austin, 2012; Titley & Titley, 1980). Similarly, there exists little agreement as to whether matriculating as undeclared versus declared affects college student persistence (Burgette & Magun-Jackson, 2009; Graunke, Woosley, & Helms, 2006; Kittendorf, 2012; Leppel, 2001; Titus, 2004, 2006). The limited, dated, and conflicting research is cause for examining if the relationship, if any, between early major declaration and degree completion is an important factor that increases the likelihood that a student graduates.

Astin's Input–Environment–Output Model

The variables in this study were operationalized into the conceptual framework of Astin's (1993) input–environment–output (I–E–O) model. The I–E–O model provides researchers with a frame through which to understand the potential effects of the interactions between the student and the environment, and how those interactions might lead to possible outcomes. Students enter colleges and universities from a variety of precollege environments, bringing with them a variety of characteristics and experiences. The I–E–O model is a more complete framework as it enables researchers to control for any differences in the effects of student inputs when conducting multivariate analyses (Astin & Antonio, 2012). Both the environments and the precollege characteristics of a student have an effect on each other as well as on the likelihood of the outputs. For this study, those outputs considered were graduation (within 6 years) and on-time graduation (within 4 years). This model provided the frame within which to consider the potential effects of matriculating with or without a major on degree completion, while still accounting for a number of the interactions that occurred between other input and environmental variables. By accounting for the effects of other variables on the output variables for graduation, it becomes possible to understand the predictability, if any, of major declaration on degree completion.

Methods

This study examined whether matriculating with a declared academic major or as undeclared is a significant factor in the degree completion and timely degree completion of full-time enrolled, first time in college students. The research question guiding this study was as follows: To what extent do the variables included in this study predict graduation of first-time in college first-year students?

Participant Data

The data sources included in this study were from a Carnegie Doctoral/Research-Extensive institution (Highest Research Activity), located in the Western United States. Longitudinal data from student academic records from institutional databases at the institutional site were retrieved for the entering Fall 2010 cohort of 4,489 full-time enrolled, first-time in college undergraduates. The data included information from the Fall 2010 term through the Summer 2016 term. The cohort included 896 undeclared students and 3,593 declared students. Of note, the institutional site from which the data for this study was retrieved has a 4-year graduation rate that ranges near 60%, a 6-year graduation rate around 85%, and a first-year persistence rate of 93% for full-time enrolled, first time in college students. The institution enrolls over 35,000 undergraduate students, with 96.7% from in-state.

Variables

The input variables within the I–E–O model for this study, depicted in Table 1, included demographic variables (gender, race/ethnicity, residency, first-generation status, socioeconomic status) and precollege academic achievement variables (American college test/scholastic aptitude test [ACT/SAT] entrance exam composite scores, earned high school grade point average (GPA), advanced placement (AP) exams, and dual enrollment credits completed). Of note, socioeconomic status is included as a dichotomous variable in this study based upon the manner in which the institutional site tracks and reports such data. The environmental variables included, as shown in Table 2, were academic unit (college) of initial academic program, academic discipline area, enrollment in developmental education coursework, enrollment in first-year seminar courses, participation in undergraduate research opportunities, and change of major. Graduation (within 6 years) and on-time graduation (within 4 years) served as the output variables in the study.

Data Analysis

For both output variables, binomial logistic regression analyses were calculated to determine the extent to which starting undeclared versus declared

Table 1. Summary of Input Variables: Student Demographics and Precollege Academic Achievement.

Variable Group	Variable	Total	
		<i>n</i>	%
Demographics	Race/Ethnicity		
	African American/Black	141	3.1
	American Indian/Alaskan Native	45	1.0
	Asian/Asian American	1,891	42.1
	Latino/Chicano	823	18.3
	Pacific Islander	16	0.4
	White/Caucasian	1,401	31.2
	Not Reported	134	3.0
	Missing Cases	38	0.8
	Gender		
	Female	2,463	54.9
	Male	2,026	45.1
	Socioeconomic		
	Lower Status	1,458	32.5
	Not Lower Status	2,208	49.2
	Nonresponse	823	18.3
	First-Generation		
First-Generation	1,707	38.0	
Non-First-Generation	2,549	56.8	
Non-Response	233	5.2	
Residency			
In-State Resident	4,341	96.7	
Out-of-State/International Resident	48	3.3	
Precollege Academic Achievement	ACT Composite		
	28 to 36	664	36.6
	19 to 27.99	1,061	58.4
	10 to 18.99	91	5.0
	0 to 9.99	0	0.0
	SAT Composite		
	1,800 to 2,400	2,590	57.8
	1,200 to 1,799	1,865	41.6
	600 to 1,199	25	0.6
	Less than 600	0	0.0
	Earned H.S. GPA		
	4.000 or above	1,799	40.1
	3.500 to 3.999	2,158	48.1
3.000 to 3.499	517	11.5	
2.500 to 2.999	13	0.3	

(continued)

Table 1. Continued

Variable Group	Variable	Total	
		<i>n</i>	%
	2.000 to 2.499	0	0.0
	1.999 or below	0	0.0
	No GPA Reported	2	0.0
	Advanced Placement		
	Passed 1 or more exams	3,492	77.8
	Did not pass an exam	997	22.2
	Dual Enrollment		
	Completed dual credit	3,147	70.1
	No dual credit	1,342	29.9

Note. GPA = grade point average; SAT = scholastic aptitude test; ACT = American college test.

Table 2. Summary of Environmental Variables.

Variables	Coding
College	1 = Agricultural & Environmental Sciences 2 = Biological Sciences 3 = Engineering 4 = Letters & Science
	0 = no, 1 = yes 0 = no, 1 = yes (dummy variable) 0 = no, 1 = yes
Academic Discipline Area	1 = Agricultural Sciences 2 = Ag Collegewide Programs 3 = Environmental Sciences 4 = Human Sciences 5 = Biological Sciences 6 = Engineering 7 = Humanities, Arts 8 = Math and Physical Sciences 9 = Social Sciences
	0 = no, 1 = yes (dummy variable) 0 = no, 1 = yes 0 = no, 1 = yes 0 = no, 1 = yes 0 = no, 1 = yes 0 = no, 1 = yes 0 = no, 1 = yes 0 = no, 1 = yes
Developmental Education/ Workload Courses	0 = Did not enroll in developmental education/workload 1 = Enrolled in developmental education/workload
Number of Developmental Education/Workload Courses	Between 0 and 13
First-Year Seminar	0 = Did not enroll in a first-year seminar 1 = Enrolled in a first-year seminar
Undergraduate Research	0 = Did not participate 1 = Participated
Change of Major	0 = Did not change major 1 = Made one or more changes of major
Number of Changes of Major	Between 0 and 5

predicted the likelihood of graduation from college within 4 years or 6 years. As the output variables are binary (i.e., graduated or did not graduate), the use of a binomial logistic regression is an appropriate analysis method to answer the research question (Peng, So, Stage, & St. John, 2002). Binomial logistic regression is used when attempting to predict the probability or likelihood that a dichotomous outcome will or will not occur (Lund Research, 2018). The logistic regression calculated for each of the graduation variables was organized using a model with two blocks in order to operationalize the I-E-O model. Block 1 for each regression included the input variables with the exception of ACT composite scores as many of the student records included in this study did not have an ACT score. Block 2 for each regression then included the environmental variables. Using Variance Inflation Factor (VIF) values, the assumption of multicollinearity was also tested and as all of the VIF values were below a value of five, the assumption was not violated (Minitab, 2013).

Findings

Graduation (6 Years)

The logistic regression model for the graduation output variable was statistically significant, for both Block 1, $\chi^2(15) = 195.844$, and Block 2, $\chi^2(30) = 584.324$, at the $p < .001$ level. Table 3 displays the summary of the cases classified correctly, variance explained, and goodness of fit for the model. Table 4 depicts a summary of the regression coefficient (B) values for Block 1 and Block 2, for those variables that were statistically significant.

Declared versus undeclared. For Block 1 of the regression model, there was no statistically significant difference in likelihood of graduation that existed between declared and undeclared students. For Block 2, however, there was a difference. The odd ratio for declared students was less than one ($Exp. (B) = .475$) and the coefficient was negative. This is representative of the variable as being associated with lower odds of the outcome being tested to occur (Szumilas, 2010), in this case graduation. Inverting the odds ratio to a value greater than one by transforming the $Exp. (B)$ was conducted with the intention to find the odds ratio for the comparison group of undeclared students. Doing so would associate undeclared students with higher odds of the outcome of graduation. The transformed $Exp. (B)$ was calculated by inverting the odds ratio ($1/.475 = 2.105$, $p < .01$) which resulted in that undeclared students were 2.105 ($p < .001$) times more likely to graduate (within 6 years) than their declared peers. Related, if students changed their initial choice of declared major, there existed no significant difference in likelihood of graduation. The number of times a student changed their choice of major, however, was

Table 3. Graduation (6 Years): Logistic Regression Analysis Summary.

Statistic	Block 1 Inputs	Block 2 Environment
Cases correctly classified	85.4%	86.8%
Variance explained (Nagelkerke R^2)	9.3%	26.3%
Hosmer and Lemeshow goodness of fit	$\chi^2(8) = 5.228, p = .733$	$\chi^2(8) = 8.163, p = .418$

Table 4. Logistic Regression Analysis for Graduation ($n = 3,624$).

Characteristic	Block 1 (B)	Block 2 (B)
Race/ethnicity (reference = White)		
Asian/Asian American	.385	.465**
Other demographics		
Female	.418***	.231*
In-state residency	.707**	.685*
Precollege academic performance		
High school GPA	.883***	1.041***
Advanced placement exams	.378**	.381**
Academic program		
Declared major	-.163	-.744***
College (reference = engineering)		
Letters and science	—	.556**
Math and physical sciences	—	-.841***
Developmental education		
High-impact educational practices		
Undergraduate research opportunities	—	1.455***
Other environmental variables		
Number of changes of major	—	1.023*

Note. B = regression coefficient. Cox and Snell $R^2 = .149$.

* $p < .05$. ** $p < .01$. *** $p < .001$.

statistically significant. For each occurrence of a change of their major, the likelihood of the student graduating increased 2.780 ($p < .05$) times. In addition to undeclared students as being more likely to graduate, other variables examined did result in some significance. In some cases, the effects were more significant than matriculating with or without a major.

Demographics. For the demographic variables, the findings from Block 1 resulted in only one of the race/ethnic groups as statistically significant. Asian/Asian American students were 1.470 ($p < .01$) times more likely to graduate when compared to White students. With the inclusion of the environmental variables in Block 2, Asian/Asian American students were again more likely to graduate,

and at a higher likelihood than with the Block 1. More specifically, Asian/Asian American students were 1.592 ($p < .01$) times more likely to graduate than their White peers. For Block 1, in terms of gender, female students were 1.519 ($p < .001$) times more likely to graduate when compared to male students. Although the difference between gender decreased in Block 2 as compared to Block 1, females were still more likely, this time at 1.260 ($p < .05$) times more likely to graduate than male students. Low-income students had a lower likelihood of graduating when compared to non-low-income students, but only with Block 1. In Block 1, non-low-income status students were 1.310 ($p < .05$) times more likely to graduate than low-income students.

With the inclusion of the environmental variables in Block 2, low-income status was no longer statistically significant. One other input variable resulted in findings that were statistically significant: residency. For students identified as in-state residents, as opposed to out-of-state or international, the difference in likelihood of graduating was roughly double. In-state resident students were 2.028 ($p < .01$) times more likely to graduate in Block 1 and 1.984 ($p < .05$) times more likely to graduate in Block 2.

Precollege academic performance. With the precollege academic performance variables, higher earned high school GPAs ($p < .001$) were associated with higher likelihood of graduation in both Block 1 and Block 2. For every one-unit increase in high school GPA in Block 1, the odds of graduating increased by 2.418 times. With the inclusion of the environmental variables in Block 2, the difference increased. For every one-unit increase in high school GPA in Block 2, the odds of graduating increased by 2.832 times. SAT composite scores, however, did not result as statistically significant in terms of likelihood of graduating. Students who passed AP exams, in contrast, were 1.460 ($p < .01$) times more likely to graduate than students who did not take or pass an AP exam in Block 1 and 1.463 ($p < .01$) times more likely to graduate in Block 2.

Environmental variables. Participation in undergraduate research opportunities at the institution appeared to be statistically significant at the $p < .001$ level. Participants in undergraduate research opportunities were 4.284 times more likely to graduate than students who had not participated. In terms of initial academic college of enrollment, when compared against students who matriculated into the College of Engineering, students who first enrolled in the College of Letters and Science were more likely to graduate (1.745, $p < .01$) at nearly twice the odds ratio. More specifically, when examining the academic discipline areas within the colleges, students who first enrolled in the area of mathematical and physical science were 2.320 ($p < .001$) times less likely to graduate.

Table 5. Graduation (4 Years): Logistic Regression Analysis Summary.

	Block 1	Block 2
Statistic	Inputs	Environment
Cases correctly classified	64.0%	66.1%
Variance explained (Nagelkerke R^2)	15.8%	20.0%
Hosmer and Lemeshow goodness of fit	$\chi^2(8) = 8.940, p = .347$	$\chi^2(8) = 4.758, p = .783$

On-Time Graduation (4 Years)

The regression calculated for on-time graduation was statistically significant for both Block 1, $\chi^2(15) = 456.672$, and Block 2, $\chi^2(30) = 586.297$, at the $p < .001$ level. Table 5 displays the summary of the cases classified correctly, variance explained, and goodness of fit for the model. Table 6 depicts a summary of the regression coefficient (B) values for Block 1 and Block 2, for those variables that were statistically significant.

Declared versus undeclared. For Block 1, no statistically significant difference in on-time graduation was found. For Block 2, the same result occurred. Whether a student matriculated as undeclared versus with a major declared, neither population had a significantly greater likelihood of graduating on-time. If students changed their initial choice of declared major, they were 1.535 ($p < .05$) times more likely to graduate on-time than students who remained in their initial choice of major. The number of times a student changed their choice of major, in contrast, was not statistically significant. Again, although matriculating as undeclared versus declared was not significant, however, other variables examined did result in some significance and as a result have a greater effect on on-time degree completion.

Demographics. For the demographic variables, in Block 1, race/ethnicity was statistically significant for two populations: African American/Black and Latinx/Chicanx. African American/Black students had an odds ratio less than one ($Exp. (B) = .525$) with a negative coefficient ($B = -.644$) which depicts a decreased likelihood of graduating on-time. More specifically, White students were associated with higher odds of the outcome of on-time graduation, with $Exp. (B)$ calculated by inverting the odds ratio ($1/.525 = 1.904, p < .01$). The result is that White students were 1.904 ($p < .01$) times more likely to graduate on-time than African American/Black students. For Latinx/Chicanx students, the odds ratio was again less than one ($Exp. (B) = .634$) with a negative coefficient ($B = -.455$). The result is that White students were 1.577 ($p < .01$) times more likely to graduate on-time than Latinx/Chicanx students. With the addition of the environmental variables in Block 2, again African American/Black

Table 6. Logistic Regression Analysis for On-Time Graduation ($n = 3,624$).

Characteristic	Block 1 (B)	Block 2 (B)
Race/ethnicity (reference = White)		
African American/Black	-.644**	-.522*
Latinx/Chicanx	-.455***	-.332**
Other demographics		
Female	.585***	.437***
Non-lower socioeconomic status	.289**	.153
Precollege academic performance		
High school GPA	.836***	.946***
Advanced placement exams	.297**	.251*
SAT composite score	.001***	.001***
Number of dual enrollment courses	.031*	.029
College (reference = engineering)		
Agricultural and environmental science	NA	.477*
Biological sciences	NA	.340**
Letters and science	NA	.882***
Academic discipline area (reference = collegewide)		
Math and physical sciences	NA	-.727***
Developmental education		
Number of developmental education courses	NA	-.209***
High-impact educational practices		
Undergraduate research opportunities	NA	.465***
Other environmental variables		
Change of major	NA	.428*

Note. Cox and Snell $R^2 = .149$. GPA = grade point average; SAT = scholastic aptitude test; B = regression coefficient; NA = not applicable.

* $p < .05$. ** $p < .01$. *** $p < .001$.

and Latinx/Chicanx students had a decreased likelihood of graduating on-time. African American/Black students had an odds ratio less than one ($Exp. (B) = .593$) with a negative coefficient ($B = -.522$) resulting in White students as 1.686 ($p < .05$) times more likely to graduate on-time. Latino/Chicano students also had an odds ratio less than one ($Exp. (B) = .717$) with a negative coefficient ($B = -.322$) with a result that found White students were 1.395 ($p < .01$) times more likely to graduate on-time. In terms of gender, in Block 1, female students were 1.796 ($p < .001$) times more likely to graduate on-time than their male peers. For Block 2, female students were 1.548 ($p < .001$) times more likely of graduating on-time than male students. Low-income students had a decreased likelihood of on-time graduation, while non-low-income student had an increased likelihood of on-time graduation. More specifically, non-low-income-status students were 1.336 ($p < .01$) times more likely to graduate on-time than students from low-income status. Income status no longer

appeared statistically significant in Block 2 once the environmental variables were included in the model.

Precollege academic performance. For Block 1 and Block 2, higher earned high school GPAs ($p < .001$) were associated with a higher likelihood of graduation on-time. More specifically, with Block 1, every one-unit increase in the student's high school GPA translated to the odds of graduating on-time increasing by 2.307 times. For Block 2, the odds of graduating on-time increased by 2.576 times for each one-unit increase in high school GPA. SAT composite scores were also associated with a higher likelihood of graduation on-time at the $p < .001$ level. For both Block 1 and Block 2, the odds of graduating on-time increased by 1.001 times for every one-unit increase in SAT composite score. Successfully passing AP exams was also statistically significant. For Block 1, students who passed AP exams were 1.345 ($p < .01$) times more likely to graduate on-time than students who did not take or pass an AP exam. For Block 2, students who passed AP exams were 1.285 ($p < .05$) times more likely to graduate on-time. Completing dual enrollment credit while in high school was not found to be significant in either Block 1 or Block 2. The number of dual enrollment credits a student completed, however, was significant in Block 1. For every one-unit increase in the number of dual enrollment credits a student earned prior to matriculating to the institution, the likelihood of graduating on-time increased by 1.031 times at the $p < .05$ level. For Block 2, in contrast, the number of dual enrollment credits earned was no longer significant.

Environmental variables. With the environmental variables, the higher the number of developmental education/workload courses taken by a student, the lower the likelihood of graduation on-time. The odds ratio for the number of developmental education/workload courses was less than one (.811, $p < .001$) with a negative coefficient (-.209) associating the higher the number of courses with a lower likelihood of graduation on-time. As such by inverting the odds ratio ($1/.811 = 1.233$, $p < .001$), the result was that as the number of developmental education/workload courses decreased by one unit, the odds of graduating on-time increase by 1.233 times. In terms of undergraduate research opportunities, participants were 1.593 ($p < .001$) times more likely to graduate on-time than nonparticipants. The college of initial enrollment appeared to be statistically significant, at varying levels, for each of the other three undergraduate colleges compared against the College of Engineering. Students who matriculated into the College of Letters and Science (*Exp. (B)* = 2.416, $p < .001$ level), the College of Biological Sciences (*Exp. (B)* = 1.404, $p < .01$ level), or the College of Agricultural and Environmental Sciences (*Exp. (B)* = 1.612, $p < .05$ level) were more likely to graduate on-time than engineering students. When examining the academic discipline areas within the colleges, students who matriculated

into the area of mathematical and physical science, within the College of Letters and Science, had a lower likelihood (2.070, $p < .001$) of graduating on-time.

Discussion

It makes little difference as to whether a student first enrolls with or without a major as it relates to their likelihood of graduating within 4 years. The initial decision to matriculate as undeclared or declared was not a predictor of on-time degree completion. Still, contrary to the commonly held perception, undeclared students were not at a higher risk of attrition from college. There existed, in contrast, a higher likelihood that an undeclared student would graduate, as measured within 6 years, than their declared peers. There were other factors that appeared to play a more important role in degree completion than initial status as undeclared versus declared. For example, gender, race/ethnicity, and high school GPA were consistently significant factors in likelihood of graduating and graduating on-time. As a result, variables other than initial choice of a college major, or lack thereof, should be where attention is placed on regarding the question of what factors are connected to successful completion of a degree.

Limitations and Implications

This study includes a number of limitations. This longitudinal study included only full-time enrolled, first time in college students, from one cohort of students over a 6-year period. Not included were students who enroll part time, who transfer from another institution, or who were pursuing a second undergraduate degree. As a result, the findings could be different for those additional populations of students.

Next, the inclusion of just one institutional site limits the applicability of the findings to other colleges and universities. As institutions can vary based on size, geographical location, student population, major and minors offered, technology, and mission, for example, a similar study conducted at another institution may yield different findings. In addition, the institutional site for this study operated on a quarter-based academic calendar. Universities that operate on a semester-based academic calendar may find different outcomes as a result of the different academic calendar. Another institutional difference that may affect outcomes is the tracking and reporting of student socioeconomic status as low-income or not low-income. Having socioeconomic status operationalized in a dichotomous manner may have resulted in a different effect than having multiple levels of status included.

Finally, the data that were available at the institutional site creates some limitations to this study. There may exist other variables that might mediate differently the effects of the interactions between the inputs and the environment

on the outcomes being measured, such as additional types of high-impact educational practices, for example.

Implications for Policy

If enrolling in college with a declared major is not a predictor of degree completion, but starting as undeclared does translate to a higher likelihood of graduating, then admission policies should place less emphasis on choice of major as a criterion for admission. Many declared students change their major (Kramer et al., 1994; The University of Texas at Austin, 2012). Students persist with their major when it is a major that has a higher level of congruence with their personal interests (Allen & Robbins, 2008, 2010; Leuwerke, Robbins, Sawyer, & Hovland, 2004) which may take some exploration and revision of initial major choices to accomplish. Some colleges and universities do not permit students to select undeclared on an application for admission and have policies that require students matriculate with a major. These policies are unnecessary given that doing so does not increase the likelihood of completing a degree, whether in 4 or 6 years.

Financial aid policy and interpretation at some institutions may also need to be reconsidered. There are a number of colleges and universities, for example, that require students to have a declared major in order to receive federal aid. At these institutions, the decision by policy makers has been to interpret federal financial aid policies as excluding undeclared students from aid eligibility. Unfortunately, according to the findings from this study, such an interpretation reflects policy makers are penalizing students who need or desire the opportunity to explore their educational options when there is no difference in the likelihood of graduating on-time. Penalizing undeclared students when they are more likely to graduate, as measured in 6 years, is counter to the welfare of the student may contribute to higher rates of attrition.

Implications for Practice

In addition to policy-related implications, there are also implications for academic advisors in their daily practice. All academic advisors, whether assigned to undeclared or declared students, whether professional staff or faculty advisors, should work with each and every student regarding major exploration. This involves, from the first advising sessions with students, the need to discuss how they chose their major, who they are, and where they would like to go. This involves assisting every undeclared student with the process of exploration and selection of an initial major. This involves advising each declared student through a process of confirming their major, revising that decision, or rejecting it to explore and find a new major more aligned to fit the student.

With the implementation of incentive-based budget systems at many institutions (Hearn, Lewis, Kallsen, Holdsworth, & Jones, 2006; Hossler, 2004), funding is often allocated in part based upon the number of students enrolled in a given major. Undeclared students are often not assigned to an academic department, and as a result are left unable to access the same opportunities as a result of a lack of funding allocated to them. Where some institutions see undeclared students not completing degrees at the same rates, it may be the result of how the funding has been allocated. As expressed earlier, many declared students change majors and change at a rate much higher than undeclared students, if the undeclared change at all (Kramer et al., 1994). If undeclared and declared students are equally likely to graduate on-time, institutional leaders may need to reconsider how funding is allocated. These incentive-based budget systems send a message to students that it is more important that they have a major, even the wrong major. Still, if major-interest congruence is important for students to persist and complete a degree (Allen & Robbins, 2008, 2010; Leuwerke et al., 2004), having students in a major that does not fit may actually contribute to higher attrition rates.

Conclusion

Many believe that to improve degree completion rates, institutions should decrease the likelihood of attrition from college by having students declare a major and declare early (Allen & Robbins, 2008; DesJardins et al., 2003; Leppel, 2001; Mangan, 2011; Onink, 2010; Simon, 2012). This study, however, finds no difference in timely degree completion for students based on the choice to matriculate as undeclared or declared. Undeclared and declared students are equally likely to complete their undergraduate degree on-time. As a result, institutional policy and practice should encourage incoming students to take the time to explore their options, rather than be required to make a decision that is uninformed and likely to change. This is because while it is not necessarily harmful or beneficial to declare a major upon matriculation, unless students have assistance with confirming, revising, or replacing that initial choice, they may have difficulty finding a major that is congruent with their interest. By assisting all students, whether initially declared or not, with major exploration, institutions increase the likelihood of major-interest congruence, which has been shown to contribute to persistence and degree completion (Allen & Robbins, 2008; Leuwerke et al., 2004). Furthermore, the findings from this study remind administrators and scholars alike that some of the perceptions that exist regarding particular student populations may not be well-informed.

The goal for institutions of higher education has been, and should continue to be, that each student finds their path to their unique contribution to society. The marker used for that milestone has garnered the name graduation with the hope that the student would be transformed. Since exploration is part of the process

for students to discern who they are, institutions should embrace exploration with the understanding that students who start as undecided face no greater risk of failing to find their way. It may be possible by encouraging, or even requiring exploration, as the norm, for institutions to improve graduation rates while also developing each student into the person who they seek to become.

Author's Note

This research was conducted as part of the requirements for the Doctor of Education degree from the University of Alabama, with Institutional Review Board approval (Protocol #17-06-311). David Spight is now at University of California, Davis, CA.

Declaration of Conflicting Interests

The author declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

David B. Spight  <https://orcid.org/0000-0002-1182-8095>

References

- Adelman, C. (2006). *The toolbox revisited: Paths to degree completion from high school through college*. Washington, DC: U.S. Department of Education.
- Allen, J., & Robbins, S. B. (2008). Prediction of college major persistence based on vocational interests, academic preparation, and first-year academic performance. *Research in Higher Education, 49*, 62–79.
- Allen, J., & Robbins, S. B. (2010). Effects of interest-major congruence, motivation, and academic performance on timely degree attainment. *Journal of Counseling Psychology, 57*(1), 23–35.
- Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco, CA: Jossey-Bass.
- Astin, A. W., & Antonio, . I. (2012). *Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education* (2nd ed.). Lanham, MD: Rowman & Littlefield Publishers, Inc.
- Bailey, T., Calcagno, J. C., Jenkins, D., Leinbach, T., & Kienzl, G. (2006). Is student right-to-know all you should know? An analysis of community college graduation rates. *Research in Higher Education, 47*(5), 491–519.
- Bailey, T. R., Jaggars, S. S., & Jenkins, D. (2015). *Redesigning America's community colleges: A clearer path to student success*. Cambridge, MA: Harvard University Press.

- Barnes, R. A., & Piland, W. E. (2011). Impact of learning communities in developmental English on community college student retention and persistence. *Journal of College Student Retention: Research, Theory & Practice*, 12(1), 7–24.
- Berkner, L., He, S., & Cataldi, E. F. (2002). *Descriptive summary of 1995-96 beginning postsecondary students: Six years later. Statistical analysis report*. Washington, DC: National Center for Education Statistics, U.S. Department of Education.
- Burgette, J., & Magun-Jackson, S. (2009). Freshman orientation, persistence, and achievement: A longitudinal analysis. *Journal of College Retention: Research, Theory & Practice*, 10(3), 235–263.
- Casselman, B. (2012, November 22). The cost of dropping out. *The Wall Street Journal*.
- Center for American Progress. (2012, August). *Performance-based funding of higher education: A detailed look at best practices in 6 states*. Retrieved from http://www.americanprogress.org/issues/2012/08/pdf/performance_funding.pdf
- Choy, S. P. (2002). *Access & persistence: Findings from 10 years of longitudinal research on students*. Washington, DC: American Council on Education, Center for Policy Analysis.
- D'Amico, M. M., Morgan, G. B., Robertson, S., & Rivers, H. E. (2013). Dual enrollment variables and college student persistence. *Community College Journal of Research and Practice*, 37, 769–779.
- DeAngelo, L., Franke, R., Hurtado, S., Pryor, J. H., & Tran, S. (2011). *Completing college: Assessing graduation rates at four-year institutions*. Los Angeles, CA: Higher Education Research Institute, UCLA.
- DesJardins, S. L., Kim, D., & Rzonca, C. S. (2003). A nested analysis of factors affecting bachelor's degree completion. *Journal of College Student Retention*, 4(4), 407–435.
- Dougherty, K. J., Jones, S. M., Lahr, H., Natow, R. S., Pheatt, L., & Reddy, V. (2016). *Performance funding for higher education*. Baltimore, MD: Johns Hopkins University Press.
- Dougherty, K. J., & Reddy, V. (2013). Performance funding for higher education: What are the mechanisms? What are the impacts? *ASHE Higher Education Report*, 39(2).
- Foote, B. (1980). Determined- and undetermined-major students: How different are they? *Journal of College Student Personnel*, 21, 29–34.
- Gansemer-Topf, A., & Schuh, J. H. (2006). Institutional selectivity and institutional expenditures: Examining organizational factors that contribute to retention and graduation. *Research in Higher Education*, 47(6), 613–642.
- Gordon, V. N., & Steele, G. (2015). *The undecided college student: An academic and career advising challenge* (4th ed.). Springfield, IL: Charles C. Thomas.
- Graunke, S. S., Woosley, S. A., & Helms, L. L. (2006). How do their initial goals impact students' chances to graduate? An exploration of three types of commitment. *NACADA Journal*, 26(1), 13–18.
- Hearn, J. C., Lewis, D. R., Kallsen, L., Holdsworth, J. M., & Jones, L. M. (2006). Incentives for managed growth: A case study of incentives-based planning and budgeting in a large public research university. *The Journal of Higher Education*, 77(2), 286–316.
- Horn, A. S. & Lee, G. (2016). The reliability and validity of using regression residuals to measure institutional effectiveness in promoting degree completion. *Research in Higher Education*, 57(4), 469–496.

- Horn, L., & Carroll, C. D. (2006). *Placing college graduation rates in context: How 4-year college graduation rates vary with selectivity and the size of low-income enrollment. Postsecondary Education Descriptive Analysis Report. NCES 2007-161*. Washington, DC: National Center for Educational Statistics, Institute of Education Sciences, U.S. Department of Education.
- Hossler, D. (2004). Refinancing public universities: Student enrollments, incentive-based budgeting, and incremental revenue. In E. P., & St. John & M. D. Parsons (Eds.), *Public funding of higher education: Changing contexts and new rationales*. Baltimore, MD: The Johns Hopkins University Press.
- Kittendorf, L. A. (2012). *An exploration of undeclared students' expectations of experiences for faculty interactions and co-curricular involvement* (ProQuest Dissertations and Theses). Retrieved from <https://search.proquest.com/docview/1013836705?accountid=14505>
- Kramer, G. L., Higley, H. B., & Olsen, D. (1994). Changes in academic major among undergraduate students. *College and University*, 69(2), 88–98.
- Kuh, G. D., Cruce, T. M., Shoup, R., Kinzie, J. & Gonyea, R. M. (2008). Unmasking the effects of student engagement on first-year college grades and persistence. *Journal of Higher Education*, 79(5), 540–563.
- Leppel, K. (2001). The impact of major on college persistence among freshmen. *Higher Education*, 41(3), 327–342.
- Leuwerke, W. C., Robbins, S., Sawyer, R., & Hovland, M. (2004). Predicting engineering major status from mathematics achievement and interest congruence. *Journal of Career Assessment*, 12(2), 135–149.
- Lewallen, W. C. (1992). Persistence of the “undecided”: The characteristics and college persistence of students undecided about academic major or career choice. *Dissertation Abstracts International*, 53(12A), 4226.
- Lewallen, W. C. (1995). Students decided and undecided about career choice: A comparison of college achievement and student involvement. *NACADA Journal*, 15(1), 22–30.
- Lund Research. (2018). *Binomial logistic regression using SPSS statistics*. Retrieved from <https://statistics.laerd.com/spss-tutorials/binomial-logistic-regression-using-spss-statistics.php>
- Mangan, K. (2011, July 11). Texas takes steps to streamline the path to a college degree. *The Chronicle of Higher Education*. Retrieved from <http://chronicle.com/article/Texas-Takes-Steps-to/128404/>
- Mayhew, M. J., Rockenbach, A. N., Bowman, N. A., Seifert, T. A., Wolniak, G. C., Pascarella, E. T., & Terenzini, P. T. (2016). *How college affects students: 21st century evidence that higher education works* (Vol 3). San Francisco, CA: Jossey-Bass.
- Miller, N. B. (2014). Nontraditional student graduation rate benchmarks. *The Journal of Continuing Higher Education*, 62(3), 141–151.
- Minitab. (2013, April 16). *Enough is enough! Handling multicollinearity in regression analysis*. Retrieved from <https://blog.minitab.com/blog/understanding-statistics/handling-multicollinearity-in-regression-analysis>
- Munoz, S. M., & Maldonado, M. M. (2012). Counterstories of college persistence by undocumented Mexican students: Navigating race, class, gender, and legal status. *International Journal of Qualitative Studies in Education*, 25(3), 293–315.

- National Commission on Higher Education Attainment. (2013). *An open letter to college and university leaders: College completion must be our priority*. Retrieved from <http://www.acenet.edu/news-room/Pages/An-Open-Letter-to-College-and-University-Leaders.aspx>
- Onink, T. (2010, December 16). Bad college advice—The undeclared major. *Forbes Magazine*. Retrieved from <http://www.forbes.com/sites/troyonink/2010/12/16/bad-college-advice-the-undeclared-major/#16fdb4441e88>
- Peng, C. Y., So, T. S., Stage, F. K., & St. John, E. P. (2002). The use and interpretation of logistic regression in higher education journals: 1988–1999. *Research in Higher Education*, 43, 259–293.
- Simon, C. C. (2012, November 2). Major decisions. *The New York Times*. Retrieved from <http://www.nytimes.com/2012/11/04/education/edlife/choosing-one-college-major-out-of-hundreds.html>
- Szumilas, M. (2010). Explaining odds ratios. *Journal of the Canadian Academic of Child Adolescent Psychiatry*, 19(3), 227–229.
- Tandberg, D. A., & Hillman, N. W. (2014). State higher education performance funding: Data, outcomes, and policy implications. *Journal of Educational Finance*, 39(3), 222–243.
- The University of Texas at Austin. (2012). *Final report of the task force on undergraduate graduation rates*. Austin, TX: Author.
- Tinto, V. (1993). *Leaving college: Rethinking the causes and cures of student attrition*. Chicago, IL: University of Chicago Press.
- Tinto, V. (2012). *Completing college: Rethinking institutional action*. Chicago, IL: University of Chicago Press.
- Titley, R. W., & Titley, B. S. (1980). Initial choice of college major: Are only the “undecided” undecided? *Journal of College Student Personnel*, 21, 293–298.
- Titus, M. A. (2004). An examination of the influence of institutional context on student persistence at four-year colleges and universities: A multilevel approach. *Research in Higher Education*, 45(7), 673–699.
- Titus, M. A. (2006). Understanding college degree completion of students with low socioeconomic status: The influence of the institutional financial context. *Research in Higher Education*, 47(4), 371–398.

Author Biography

David B. Spight began his career providing academic advising to undecided students at Colorado State University. In 2008, he was named the Assistant Dean for Academic Advising in the School of Undergraduate Studies at the University of Texas at Austin and was tasked with developing a new advising center for a new academic unit aimed at helping students explore majors. In 2016, he transitioned to a new position as Director of Undergraduate Affairs in the College of Engineering at the University of California, Davis. Spight has been highly involved in NACADA: The Global Community for Academic Advising, a professional organization focused on enhancing academic advising with nearly 15,000 members nationally and internationally. He has served as chair of Commission on Undecided/Exploratory Students, a member of the

council, a board member, Vice President, and most recently as President. Spight has presented and published articles on advising undecided students, first-generation students, assessment of advising, and integrating academic and career advising. Spight earned his Doctorate of Education in Higher Education Administration from the University of Alabama.