

# Predicting Academic Difficulty Among First-Semester College Students

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*Higher education retention research has taken on renewed importance recently, with support for standardized entrance exams waning and student loan debts commanding social and political attention. Economic pressures have further exasperated college attrition and pushed researchers to identify at-risk students better before they experience academic difficulty. This study aimed to evaluate the predictive quality of pre-college academic motivation, self-efficacy for learning, learner autonomy, and perceived social support on first-semester academic outcomes. Participants completed established surveys assessing the four variables before the start of the Fall 2021 semester. Fall semester academic outcomes were obtained after the semester, with students naturally differentiating into one of two categories: satisfactory academic standing ( $\geq 2.0$  GPA) or academic probation ( $< 2.0$ ). Discriminant analysis was performed to determine if the four predictor variables could reliably predict first-semester academic outcomes. Results indicated that the variables could accurately predict first-semester academic outcomes with 77.8% classification accuracy. Academic motivation was found to have a negligible predictive impact, with self-efficacy for learning, learner autonomy, and perceived social support maintaining the same predictive accuracy in its absence. Implications for admissions and academic support practice are discussed.*

*Keywords: student retention, academic motivation, self-efficacy for learning, learner autonomy, perceived social support*

The concept of student retention has been a focus of higher education for much of its existence (Habley et al., 2012). However, the topic has taken on renewed importance recently as higher education has become an extension of the traditional education pipeline. Many high school students perceive college as the next logical step upon graduation. Between 2000 and 2018, undergraduate college enrollment increased by 26%, with 16.6 million enrolled students in the United States in 2018 (National Center for Education Statistics [NCES], 2021a). Despite the disruption caused by the COVID-19 pandemic, higher education remains an important tool for upward socioeconomic mobility. A recent report by the United States Bureau of Labor Statistics (2022) noted that college graduates over the age of 25 had a median weekly income of \$1,556 in the third quarter of 2022, compared to \$866 for those without a college degree.

As higher education continues its recovery, student cost of attendance rises, and the political debate over student loan debts remains stagnant, it is critical for those who start college to persist to graduation. Those who do not persist to graduation face various negative social, economic, and psychological consequences. Fass et al. (2018) found that those who drop out of college experience lower socioeconomic status, poorer self-regard, a higher incidence of depression, and the burden of incurring student debt without achieving a degree. Nevertheless, 38% of students who seek a 4-year degree do not graduate within six years (NCES, 2021b). Pre-pandemic year-to-year retention rates for all college types stand at 81% (NCES, 2021b), but a significant discrepancy exists between more selective institutions and those with more open admissions policies. Institutions that admit less than 25% of those who apply have an average retention rate of 97%, while those with more open policies average just 62% (NCES, 2021b). This discrepancy suggests that institutions with more liberal admissions policies may be admitting underprepared students at risk of financial hardship without completing their degrees (Hansen, 1998). Indeed, many of these students risk academic probation or separation if they cannot meet minimum grade requirements (Lindo et al., 2010), impacting future eligibility for financial aid and graduation.

Institutions attempt to address retention issues and at-risk students with various academic support initiatives designed to promote academic success and degree persistence (Casey et al., 2018). Various retention frameworks, including college dropout models, student attrition models, and student integration models, have been developed to explain the factors that lead students to separate from institutions. These models emphasize a variety of criteria, including Bean's focus on student attitudes, Tinto's attention on student-institution fit, and Pascarella and Terenzini's stress on sociocognitive development (Manyanga et al., 2017). However, many of these programs are reactionary, requiring students to experience academic difficulty so

that academic support departments can identify them. Warning labels like academic probation alert support staff and students to the need for change. However, this strategy requires that students first experience failure and, thus, dig themselves out of the academic hole. In 2016, Schudde and Scott-Clayton noted that an estimated 20% of first-year students obtained a GPA below 2.0, often used as the threshold marker of academic probation. Relatedly, Mathies et al. (2006) found that just 5% of students who fell onto academic probation were able to graduate in 4 years.

Standardized tests like the SAT and ACT were once nearly universal requirements for college applications and were often used to identify at-risk students. However, more than half of American institutions have transitioned to test-optional admissions policies in recent years (The National Center for Fair and Open Testing [FairTest], 2021b). According to FairTest (2021a), more than 60% of institutions will be test-optional or test-blind for the Fall 2022 admissions cohort. The declining popularity of standardized tests in college admissions may have unintended consequences for higher education. Firstly, removing standardized tests from admissions requirements will save applicants money as they avoid test fees and the cost of study materials. However, this may be an issue for admissions departments if students utilize these savings to apply to more institutions (Jump, 2021). This may be a particular concern for universities that already receive a substantial number of applications. Secondly, schools may find it challenging to determine which incoming students are at risk of academic difficulty. Historically, standardized test scores and high school GPA have been used in combination to predict student success. The transition from standardized testing pressures institutions to identify and help potentially at-risk incoming students. Consequently, alternative academic achievement and preparedness measures will become more critical in student retention efforts (National Association for College Admissions Counseling [NACAC], 2020).

## **ACADEMIC RISK FACTORS**

Research has identified many potential predictors of academic difficulty. Many of these factors are associated with college readiness, which Conley (2007) defined as the level of preparation needed to succeed in a general education college course without remediation. Greene and Forster (2003) suggested that while 70% of high school students graduate from K-12 education, just 32% can be considered college ready. Those lacking college readiness are at an increased risk of failing courses and leaving college, particularly during the first year of enrollment (Horton, 2015). Horton (2015) described at-risk students as those with higher probabilities of experiencing academic difficulty and separation and differentiates risk factors into three domains: background characteristics like first-generation status and socioeconomic status, individual characteristics such as poor self-efficacy and a lack of autonomy, and environmental factors like a lack of support or mentoring. Despite an exhaustive list

of associated considerations, researchers and practitioners have identified several factors critical to college perseverance that are of particular interest to the current study, including low academic motivation, low self-efficacy for learning, a lack of learning autonomy, and a lack of social support.

### **ACADEMIC MOTIVATION**

Motivation, as a concept, is a critical factor influencing behavior and performance, and educational researchers have prioritized motivation as one of the most important attributes impacting student success (Turan, 2015; Ozen, 2017). Academic motivation is intrinsic or extrinsic motivation applied to educational outcomes (Deci & Ryan, 2000). Hidi and Harackiewicz (2000) identified academic motivation as one of the primary factors associated with academic performance. Nicholls (1979) posited that those with lower academic motivation are at an educational disadvantage. Jozsa and colleagues (2022) identified that high levels of learning motivation were associated with increased learning intention in higher education. This is likely related to the finding that students exhibit greater effort in pursuing academic outcomes when autonomously motivated (Leon et al., 2015).

Furthermore, academic motivation has been linked with other factors associated with academic success, such as student engagement (Kuh et al., 2005). Additionally, academic motivation has been associated with social integration and perceived support (Van Etten et al., 2008), linking the factor to Tinto's student departure theory. Interestingly, Blauch and Wise (2011) found that academic motivation decreases as a student progresses, further outlining the importance of identifying motivation levels early in a college career.

### **SELF-EFFICACY FOR LEARNING**

Bandura (1997) posited that self-efficacy, or belief in one's ability to perform at a certain level, impacts the motivation to engage in a task. Self-efficacy is determined by internal evaluations of one's ability to perform and translate skills into action. Personal evaluations are the key factors of human agency, determining whether a person will attempt and persist through, avoid, or withdraw from the task. In this sense, perceived self-efficacy regulates expectations of success or failure, influencing the effort taken to succeed and the mentality with which one may approach a difficult task (Bandura, 1997). According to Bandura (1997), "skills can be easily overruled by self-doubts, so that even highly talented individuals make poor use of their capabilities under circumstances that undermine their beliefs in themselves" (p. 37). Schunk and Zimmerman (2006) noted the connection between self-efficacy, learning, motivation, and achievement. Salazar and Hayward (2018) found that academic self-efficacy could predict student motivation, while problem-solving self-efficacy was a predictor of academic expectations. Bujack (2012) found that self-efficacy was directly linked to

the amount of time students spend in a course, credits earned, and goal completion, suggesting that those with high expectations of success were more likely to persist through adversity and achieve their academic goals. Mahan (2017) also found that higher levels of self-efficacy were correlated with a return to good academic standing among college students placed on probation.

These internal assessments can impact academic behaviors, such as persistence, problem-solving, resiliency, and psychological well-being (Bandura, 1997). Higher levels of academic self-efficacy have been associated with increased academic success (Li, 2012). Bandura (1997) noted that self-efficacy is valued because it is essential for someone to adapt and change, which is a primary tenant of the learning process (Ciccarelli & White, 2021). A meta-analysis conducted by Multon et al. (1991) found significant positive relationships between self-efficacy, academic success, and persistence. Krumrei-Mancuso et al. (2013) found that self-efficacy was a predictor of first-semester academic outcomes and could predict first-year academic success after controlling for first-semester GPA. Additionally, Kahn et al. (2019) identified academic self-efficacy as a protective factor facilitating academic success and adjustment.

### **LEARNER AUTONOMY**

Considerable work has connected the concept of learning autonomy to academic success. Confessore (1992) noted that autonomous learning is a psychological precursor to learning and comprises four conative factors: desire, initiative, resourcefulness, and persistence (Carr, 1999). Ponton (1999) defined learner autonomy as “the characteristic of the person who independently exhibits agency in learning activities” (p. 13). Collectively, the four conative factors of autonomous learning influence student performance. Güneş and Alagözlü (2020) found that learning autonomy was interrelated with motivation, while Tilfarlioglu and Ciftci (2011) identified positive relationships between autonomous learning and self-efficacy and between autonomous learning and academic success. Indeed, the individual works of Ponton (1999), Carr (1999), and M. G. Derrick (2001) each highlight the significant impact that the conative factors of autonomous learning have on academic outcomes.

### **PERCEIVED SOCIAL SUPPORT**

Finally, social support has been shown to play an important role in college success, particularly in underrepresented students (Mishra, 2020). As opportunities for higher education expand, individuals from various social, economic, and academic backgrounds seek upward social mobility through education. Researchers have identified an achievement gap between those from high and low socioeconomic backgrounds. Willingham (2012) found that those from lower socioeconomic backgrounds had fewer social resources to draw on. Hossler et al. (1999) also noted

that social support is vital in retaining complex course content. Others have indicated that social support helps students connect with their institutions and improve success and retention rates (Gallop & Bastien, 2016). Transitioning from high school to higher education is accompanied by significant shifts in students' social and academic environments (Eggens et al., 2008). As a result, the support of friends, family members, and institutions helps students to effectively transition out of the household by providing social capital (Mackinnon, 2012; Mishra, 2020). Pascarella and Terenzini (1980) found that positive social interactions with faculty members lead to greater student persistence. Tinto (1997) noted that connections to the university are critical for student retention and success.

Accurately identifying at-risk students is of immediate concern for higher education (Jewell & Riddle, 2005). The decreasing popularity of traditional college readiness measures, like the SAT, enhances the need for alternative methods. Academic motivation, self-efficacy for learning, learner autonomy, and perceived social support have been linked with college success. This study aims to assess the combined effect of these factors in predicting academic difficulty in first-semester college students. Program administrators can use this information to identify at-risk students and develop tailored interventions through established support programs. The following research question and null hypothesis guided the development of the study:

- RQ: Can one reliably predict academic difficulty after the first semester based on academic motivation, self-efficacy for learning, learner autonomy, and perceived social support?
- H<sub>0</sub>: Academic motivation, self-efficacy for learning, learner autonomy, and perceived social support cannot reliably predict first-semester academic difficulty.

## Method

### DESIGN

The current study used a nonexperimental causal-comparative research design with a cross-sectional survey method. After receiving Institutional Review Board approval, student's pre-college responses to the Academic Motivation Scale-College Version (AMS-C 28), Self-Efficacy for Learning Form-Abridged (SELF-A), Autonomous Learning Scale (ALS), and Multidimensional Scale of Perceived Social Support (MSPSS) were analyzed in conjunction with first-semester academic outcomes. Students fell into dichotomous categories based on their end-of-semester academic outcomes. Those who obtained a semester GPA of 2.0 or above were assigned to the academically successful category to signify good academic standing. In contrast, those with GPAs of 1.99 or below were administratively assigned to the academic probation category to signify unsatisfactory academic standing. These GPA cutoffs reflected the host institution's policy and were based on satisfactory academic progress requirements. Discriminant analysis was conducted to determine whether the four predictor variables could accurately predict a student's membership in the dichotomous academic standing categories. Significance for the analysis was set to the  $p = .05$  level. The data for this study is available at <https://osf.io/xz3wa/>. The study design was not preregistered.

### SAMPLE

The target population consisted of 233 college students enrolling in their first semester of higher education at a private, rural, and predominantly undergraduate University in North Carolina. 61.9% of applicants were admitted in the Fall 2020 cohort, according to the most recent publicly available information (NCES, 2020). College transfer students were omitted as they had already completed their first semester of post-high school education. Additionally, those under the age of 18 were excluded as they could not consent to the release of their information without the attestation of a parent or guardian who was not present during the orientation program assessment session.

One hundred fourteen students consented to participate in the study, resulting in a moderate response rate of 48.9%. Nardi (2018) noted that a very good response rate is 70%, but it is common for response rates between 20 and 30%, depending on the method of survey administration. However, response rates below 60%, like this study's, should be interpreted cautiously. The demographics obtained from the institution are displayed in Table 1.

**Table 1**  
**Participant Demographics (N = 114)**

Characteristic	Null	Respondent	%
Gender	0		
Male		59	51.8
Female		55	48.2
Ethnicity	15		
White or Caucasian		56	49.1
Black or African American		27	23.7
Hispanic		8	7.0
Native American or Alaskan Native		2	1.8
Two or more races		6	5.3
First-generation status	4		
Yes		24	21.1
No		79	69.3
No parent data		7	6.1
Athletic status			
Yes		69	60.5
No		45	39.5
International student	1		
Yes		12	10.5
No		101	88.6
Residential status	3		
On-campus housing		100	87.7
Off-campus housing		11	9.6

### Instrumentation

Established research instruments were used to measure the target variables of academic motivation, self-efficacy for learning, learner autonomy, and perceived social support. Academic motivation was measured using the Academic Motivation Scale–College Version (AMS-C 28) developed and validated by Vallerand et al. (1992). The AMS-C 28 is a 28-item assessment of academic motivation crafted for the college population. It utilizes a 7-point Likert scale with corresponding textual options ranging from 1 (*does not correspond at all*) to 7 (*corresponds exactly*) and measures intrinsic motivation (three subscales), extrinsic motivation (three subscales), and amotivation (one subscale) with scores reflecting attitudes and beliefs held by students about themselves and their commitment to higher education. The AMS-C is an English language version of a French–Canadian instrument called the Motivation



Toward Education Scale (Vallerand et al., 1989) with internal consistency ranging from .83 to .86 in the English translation (Vallerand et al., 1992). Reliability of the AMS-C 28 assessment tool in an American student population has been established with Cronbach's alphas ranging from .70 to .86 (Cokley et al., 2001). The AMS-C 28 has been used by other researchers studying academic motivation in American and non-French-Canadian samples (see Kapp et al., 2020; Morgan, 2018; Wakeman, 2020). For the purpose of this study, academic motivation was viewed in general terms, with extrinsically and intrinsically minded students viewed as academically motivated and those lacking in either as amotivated.

Self-efficacy for learning was measured using the Self-Efficacy for Learning Form-Abridged (SELF-A) developed by Zimmerman and Kitsantas (2007). The SELF-A is a shortened version of the Self-Efficacy for Learning Form developed by the same authors in 2005 that reduced the number of form items from 57 to 19. The SELF-A used a scale ranging from 0 (*definitely cannot do it*) to 100 (*definitely can do it*) in increments of 10. An exploratory principal component factor analysis revealed one factor accounting for 67% of the variance with loadings greater than .70 for all 19 items. Interestingly, the SELF-A was found to be a better predictor of a variety of variables when compared to the long-form version, including grades, perceived responsibility, and SAT scores (Zimmerman & Kitsantas, 2007).

Learner autonomy was measured using the Autonomous Learning Scale (ALS), a brief measure of autonomous learning designed for university students developed by Macaskill and Taylor (2010). The ALS was designed with the intention of producing a short, psychometrically sound instrument that could be utilized in learner autonomy research in college populations, featuring 12 items scored on a 5-point Likert scale (Macaskill & Taylor, 2010). Concurrent validity was attained through comparison to the Self-Directed Learning Readiness Scale (Fisher et al., 2001), an established instrument used to measure "general readiness to undertake independent learning" (Macaskill & Taylor, 2010, p. 7). A second study utilized a more diverse sample and compared the performance of the ALS to the Self-Directed Learning Readiness Scale (Fisher et al., 2001). Principal component analysis provided evidence for a two-factor model with Cronbach's alphas above .70 and correlations indicating satisfactory concurrent validity (Macaskill & Taylor, 2010).

Student self-perceptions of social support were evaluated using the Multidimensional Scale of Perceived Social Support (MSPSS) developed by Zimet et al. (1988). The 12-item scale utilizes a 7-point Likert scale to analyze self-reported perceptions of subjectively assessed social support among family, friends, and significant others. The scale was developed using a college-aged sample comprised of predominantly freshman participants. Additionally, 69 study participants were retested to establish

test-retest reliability. Confirmatory factor analysis identified three factors related to the source of the social support (family, friends, significant other). Cronbach's alphas ranged from .85 to .91 for each of the factors, with an overall scale coefficient of .88. (Zimet et al., 1988). Overall, the test-retest reliability was also found to be .85, indicating good internal reliability and stability (Zimet et al., 1988). Construct validity was evaluated on the hypothesis that perceived social support would be negatively correlated with anxiety and depression, which was found to be the case. Zimet et al. noted that the homogeneity of the test population might be an issue for those considering the instrument for research purposes. However, the MSPSS was developed and validated with a college population resembling that of the target population of the current study.

The instruments were packaged into a single document while maintaining their original form and format and administered in person to students as part of the Fall 2021 new student orientation program prior to the start of the semester.

## Results

Discriminant analysis was conducted to evaluate the null hypothesis that academic motivation, self-efficacy for learning, learner autonomy, and perceived social support cannot reliably predict first-semester academic standing using Statistical Package for Social Science (SPSS 28). The criterion variable was academic standing (academic probation [ $n = 20$ ] and good academic standing [ $n = 79$ ]). The predictor variables were academic motivation (academic probation:  $M = 114.25$ ,  $SD = 23.31$ ; good academic standing:  $M = 121.90$ ,  $SD = 22.00$ ), self-efficacy for learning (academic probation:  $M = 1186.00$ ,  $SD = 257.20$ ; good academic standing:  $M = 1323.29$ ,  $SD = 264.62$ ), learner autonomy (academic probation:  $M = 39.80$ ,  $SD = 6.34$ ; good academic standing:  $M = 45.65$ ,  $SD = 6.27$ ), and perceived social support (academic probation:  $M = 52.80$ ,  $SD = 13.82$ ; good academic standing:  $M = 69.62$ ,  $SD = 11.95$ ).

Wilks' Lambda was used to evaluate the equality of group means of each predictor variable and found to be significant for self-efficacy for learning ( $p = .04$ ), autonomous learning ( $p < .001$ ), and perceived social support ( $p < .001$ ). Academic motivation ( $p = .17$ ) was found to be insignificant. Multivariate normality was evaluated using normal P-P plots and found to be tenable. Visual inspection indicated that each predictor variable was normally distributed, and Mahalanobis distance did not identify significant multivariate outliers. Box's M was used to assess the homogeneity of covariances and proved tenable,  $F(10, 5363.15) = 1.13$ ,  $p = .34$ , indicating no significant differences in the log determinants.

The overall Wilks' Lambda was significant, Wilks'  $\lambda = .73$ ,  $X^2(4, N = 99) = 30.18$ ,  $p < .001$ , indicating that pre-college self-reports of academic motivation, self-efficacy for learning, learner autonomy, and perceived social support can reliably predict academic standing at the end of the first semester of college. The canonical correlation was .52, and the squared canonical correlation was .27, suggesting that the four predictor variables account for 27% of the variance in academic standing (academic probation or good academic standing). The standardized canonical discriminant functions coefficients indicated that the most critical predictor was perceived social support (.87), followed by learner autonomy (.57), self-efficacy for learning (-.39), and academic motivation (-.02) with students who ended the semester on academic probation demonstrating lower self-reported perceptions on each of these variables.

Table 2 presents the within-group correlational coefficients for each predictor variable with the discriminant function and their standardized weights. The unstandardized discriminant function prediction equation was  $D = .070x_1 + .091x_2 - .001x_3 - .001x_4 - 6.698$ , where  $D$  = discriminant function,  $x_1$  = perceived social support,  $x_2$  = learner autonomy,  $x_3$  = self-efficacy for learner, and  $x_4$  = academic motivation. Cases with  $D \leq .00018$  are classified as academic probation, and cases with  $D > .00018$  are classified as good academic standing.

**Table 2**  
***Standardized Coefficients and Correlations of Predictor Variables With the Discriminant Function***

Predictor	Correlation coefficients with discriminant function	Standardized coefficients for discriminant function
Perceived social support	.90	.87
Learner autonomy	.62	.57
Self-efficacy for learning	.35	-.39
Academic motivation	.23	-.02

Classification results, displayed in Table 3, showed that the canonical discriminant function correctly classified 77.8% of original grouped cases. Out of 20 students placed on academic probation, group membership was correctly predicted for 16 (80% were correctly classified) students; and out of 79 students who finished the semester with good academic standing, group membership was correctly predicted for 61 students (77.2% were correctly classified). Leave-one-out cross-validation results showed that the canonical discriminant function correctly classified 77.8% of cross-validated grouped cases. Out of 20 probation students, group membership was correctly predicted for 16 students (80% were correctly classified); and out of 79

students to earn good academic standing, group membership was correctly predicted for 61 students (77.2% were correctly classified).

**Table 3**  
*Classification Results for Four-Factor Discriminant Analysis*

	Academic standing	Academic probation	Good academic standing	Total
<b>Count</b>	Academic probation	16	4	20
	Good academic standing	18	61	79
	Ungrouped cases	0	3	3
<b>%</b>	Academic probation	80%	20%	100%
	Good academic standing	22.8%	77.2%	100%
	Ungrouped cases	0%	100%	100%

A second discriminant analysis was performed to assess the impact of removing academic motivation as a predictor variable. The initial analysis found academic motivation to have the weakest contribution to the overall equation. Wilks' Lambda was used to evaluate the equality of group means of each predictor variable and found to be significant for self-efficacy for learning ( $p = .04$ ), autonomous learning ( $p < .001$ ), and perceived social support ( $p < .001$ ). Multivariate normality was evaluated using normal P-P plots and found to be tenable. Visual inspection indicated that each predictor variable was normally distributed, and Mahalanobis distance did not identify significant multivariate outliers. Box's M was used to assess the homogeneity of covariances and proved tenable,  $F(10, 6987.03) = .24, p = .96$ , indicating no significant differences in the log determinants.

The overall Wilks' Lambda for this second analysis was significant, Wilks'  $\lambda = .73, X^2(3, N = 99) = 30.33, p < .001$ , indicating that pre-college self-reports of self-efficacy for learning, learner autonomy, and perceived social support can reliably predict academic standing at the end of the first semester of college. The canonical correlation was .52, and the squared canonical correlation was .27, suggesting that the three predictor variables account for 27% of the variance in academic standing (academic probation or good academic standing). The standardized canonical discriminant functions coefficients indicated that the most critical predictor was perceived social support (.87), followed by learner autonomy (.56), and self-efficacy for learning (-.38), with students who ended the semester on academic probation demonstrating lower self-reported perceptions on each of these variables. The unstandardized discriminant function prediction equation was  $D = .07x_1 + .090x_2 - .001x_3 - 6.758$ , where  $D$  = discriminant function,  $x_1$  = perceived social support,  $x_2$  = learner autonomy,  $x_3$  = self-

efficacy for learner. Cases with  $D \leq .00248$  are classified as academic probation, and cases with  $D > .00248$  are classified as good academic standing.

Classification results showed that the canonical discriminant function correctly classified 77.8% of original grouped cases. Out of 20 students placed on academic probation, group membership was correctly predicted for 16 (80% were correctly classified) students; and out of 79 students who finished the semester with good academic standing, group membership was correctly predicted for 61 students (77.2% were correctly classified). Leave-one-out cross-validation results showed that the canonical discriminant function correctly classified 77.8% of cross-validated grouped cases. Out of 20 probation students, group membership was correctly predicted for 16 students (80% were correctly classified); and out of 79 students to earn good academic standing, group membership was correctly predicted for 61 students (77.2% were correctly classified).

## Discussion

This study attempted to evaluate the predictive quality of pre-college self-reports of academic motivation, self-efficacy for learning, learner autonomy, and perceived social support on first-semester academic outcomes. Specifically, this study sought to establish if the four-predictor variable could accurately predict whether a student would finish their first semester on academic probation or in good academic standing, as defined by the host institution's policies.

The analysis revealed the predictive quality of the four variables to be statistically significant at the  $p < .001$  level, indicating that academic motivation, self-efficacy for learning, learner autonomy, and perceived social support can be used to predict first-semester academic standing (academic probation vs. good academic standing). The squared canonical correlation suggested that 26% of the variance in academic standing could be attributed to the four predictor variables. Overall, the prediction equation accurately accounted for group membership in 77.8% of cases, with slightly higher accuracy (80%) for those placed on academic probation. Perceived social support was the most critical predictor variable with a high canonical discriminant functions coefficient, reflecting its centrality to the student retention and attrition models previously discussed. The second most important variable was learner autonomy, which had a moderate canonical discriminant functions coefficient, followed by self-efficacy for learning with a low canonical discriminant functions coefficient. Finally, academic motivation proved to have the weakest discriminant ability.

The observed results for perceived social support, learner autonomy, and self-efficacy for learning are consistent with established literature that has linked them to academic success. Theories of student retention, persistence, and attrition have long emphasized the importance of social integration and connectedness (see Tinto, 1993), while other researchers have directed connected social support to the retention of information (Gallop & Bastien, 2016; Hossler et al., 1999). The components that drive learner autonomy, such as resourcefulness and persistence, have also been closely linked to student success (Carr, 1999; Ponton, 1999). Self-efficacy has been shown to impact various academic behaviors, such as persistence, problem-solving, and resiliency, with higher levels of academic self-efficacy associated with increased academic success (Bandura, 1997; Li, 2012).

The observed result for academic motivation is interesting as established research has outlined the variable's importance relative to academic outcomes, reflecting the conclusions of Hidi and Harackiewicz (2000) and Nicholls (1979). The very weak canonical discriminant functions coefficient for academic motivation suggests it had little predictive value in the discriminant equation. In response, a second discriminant analysis was performed using the perceived social support, learner autonomy, and self-efficacy for learning predictor variables and excluding academic motivation. This second analysis supported the conclusion that academic motivation had little predictive value, as the three-variable equation correctly classified the same number of overall cases (77.8%), students on academic probation (80%), and those who made satisfactory academic progress (77.2%). The overall prediction equation did not significantly change.

## **LIMITATIONS**

This study was conducted at a private, predominantly undergraduate, 4-year institution in rural North Carolina. The institutional characteristics were relatively diverse, yet several sample characteristics should be noted. Many (69.3%) of the students included in the sample did not identify as first-generation students in their college applications. Most of the participants (60.5%) were student-athletes, reflecting the high proportion of student-athletes at the host institution but diverging from national representation. Additionally, the analysis of this study may have been influenced by sample size, with the number of participants who finished the Fall 2021 semester on academic probation relatively small.

The nonexperimental *ex post facto* research design meant that the researcher assessed the predictive value of the variable after the Fall 2021 academic semester had concluded. The researcher was unable to assess how the pre-college perceptions changed throughout the semester or if any confounding events took place to influence the results. Additionally, participants were not surveyed at the end of the semester to determine if any external factors occurred in their lives that may have influenced their

academic performance. This may be significant as the study coincided with a global pandemic that could have produced unique life events during the semester.

### **IMPLICATIONS FOR PRACTICE**

Higher education has many empirically sound academic support programs that have been shown to improve student outcomes, increase retention, and facilitate persistence to graduation. However, many of these programs are reactionary in that students must make their risk of failing known to administrators by struggling. Proactive support programs have struggled to identify which students should receive the bulk of their attention, partly due to recent controversies associated with the admissions tests like the SAT and ACT. This research has shown that academic risk can be evaluated prior to a student's first semester and that the collected information can accurately predict first-semester outcomes. While not predictively perfect, administrators can use these variables to create student-centered interventions that address the needs of each student.

### **SUGGESTIONS FOR FUTURE RESEARCH**

As discussed, recent trends away from traditional college readiness measures have been exacerbated by the COVID-19 pandemic. This shift has mirrored social desires to eliminate historical barriers to higher education. Institutions that eliminate SAT or ACT requirements reduce the financial burden of the application process, which may also allow students to apply to a broader pool of institutions. With this benefit comes the potential that schools will receive applications from students who would not have applied otherwise, potentially increasing the number of students exploring the possibility of college degrees. While the full impact of COVID-19 on higher education will not be known for some time, institutions must now identify assessment methods that can help identify and assist at-risk students early in their college careers. Early identification is vital for student success and could connect students with resources that improve persistence and increase the chance of graduation. Institutionally, early identification allows institutions to target intervention programs and better use budgetary funds. Additionally, the positive impact on retention rates could improve enrollment and ease budgetary concerns.

This study found that self-reported pre-semester academic motivation, self-efficacy for learning, learner autonomy, and perceived social support can predict academic outcomes after the first semester. This could flip the academic support model and help target early academic interventions to those needing it most. While academic motivation played an insignificant role in this prediction, future research should refine the prediction equation and confirm the importance of these variables. Future researchers may also seek to develop a holistic measure of academic risk based on the identified variables that integrate into a more cohesive instrument.

Established literature has identified academic motivation as a variable of interest in academic success. This study could not lend further evidence to the literature on the subject. Further research may be needed to identify the conditions in which academic motivation has the most considerable impact on academic success and when it does not bear influence. Specifically, this research did not differentiate between extrinsic and intrinsic motivation, instead focusing on a more general form of academic motivation that treated both extrinsically and intrinsically motivated students as academically motivated. In essence, this study focused on academic motivation compared to amotivation. Future research may benefit by differentiating between extrinsic and intrinsic motivation in academic initiatives. Furthermore, future research may benefit from further investigating fluctuations in academic motivation among the COVID-19 enrollment class and how the pandemic has impacted overall academic motivation.

## Conclusion

This study found that academic motivation, self-efficacy for learning, learner autonomy, and perceived social support can be used to accurately predict first-semester academic outcomes. Academic motivation had a negligible impact on the predictive value of the assessment, providing a surprising result in which the same predictive accuracy could be obtained using a three-factor equation. The findings suggest that support programs could identify at-risk students with confidence before they even step foot in a classroom and develop targeted programs that address the individual student needs identified in the assessment. Proactively addressing at-risk students can significantly improve student retention by addressing potential issues before they can harm the student. Doing so could allow the school to adopt interventions that keep students on track rather than attempting to get them back on track retroactively. Such focus could also have significant implications as departments can better allocate funds and resources to the students who need them most. Additionally, these findings support and further established literature on the nature of student success and college transition and provide insight into the roles of self-efficacy, learner autonomy, and perceived social support in the context of higher education. Finally, these results can influence institutional culture and policy for the betterment of at-risk students and ensure that institutions meet their ethical obligations to help students develop the skills necessary for success in the classroom and beyond.

## Author Note

The raw data for this study is available, unrestricted, at <https://osf.io/xz3wa/>.

The author has no conflicts of interest to disclose.

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