First-Generation and Non-First-Generation Students: A Multi-Factor Exploration of Undergraduate Success

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Student success is a vital construct within academia, and, as such, considerable explorations have attempted to identify contributing factors. However, these studies typically focused on only one or two aspects of academic achievement (i.e., motivation, study skills, or self-efficacy). In the present study, we used five separate instruments to identify a set of factors that predict academic success for both first-generation and non-first-generation students, measured by grade point average (GPA). For all students, multiple regression analyses revealed that amotivation, introjected extrinsic motivation, external regulation extrinsic motivation, study skills, identified extrinsic motivation, support from a significant other, and autonomy were significant predictors of GPA. In comparison, multiple regression analyses revealed that first-generation students' GPA was primarily predicted by only amotivation, social support from friends, intrinsic motivation toward accomplishment, and support from a significant other. Our results support the importance of fostering intrinsic motivation for academic success in both groups of students, highlight the critical role of social support for this outcome, and provide evidence that first-generation students' motivation may differ from that of their peers.

Postsecondary student success is an increasing concern, with colleges and universities often measuring this construct in terms of retention and attrition combined with graduation rates. Measures of success impact institutional rankings, financial stability, and reputation (Delen, 2010), as well as potential government funding (DeAngelo, Franke, Hurtado, Pryor, & Tran, 2011). In addition to the influence on academic institutions, student success is critical because failing to complete a degree may result in an accumulation of debt, lower earning power, and potentially limited future career options (Kena et al., 2016; Reardon, 2011). Furthermore, burdens of financial costs are not limited to academic institutions or students but extend to local communities. For example, Schneider (2010) reported that during the five-year period spanning 2003-2008, taxpayers spent over $9 billion on students who did not advance beyond their first year, with the federal government providing an additional $1.5 billion in grants. With so much at stake,

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identifying factors facilitating both student progress and degree attainment is of immense importance.

Despite considerable research conducted on academic success, many students continue to struggle. Even though first-year retention is a primary emphasis of many studies, numerous students still leave college after their first year (Pascarella & Terenzini, 2005; Walsh & Robinson Kurpius, 2016). Involvement, engagement, and integration have received attention from researchers interested in student retention (e.g., Webber, Krylow, & Zhang, 2013; Wolf-Wendel, Ward, & Kinzie, 2009), yet many studies are limited to the first year of college. Thus, factors that influence student retention and success beyond this period are not as frequently considered. Respondek, Seufert, Stupnisky, and Nett (2017) explored outside of this barrier and found that perceptions of control over academic achievement were more predictive of success for second-year than for first-year students.

Although numerous studies (e.g., Allen, Robbins, Casillas, & Oh, 2008; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2007) provide support for motivation and persistence models of education, other factors also influence student success. For example, Krumrei-Mancuso, Newton, Kim, and Wilcox (2013) found that academic self-efficacy, stress and time management, involvement with college activities, and emotional satisfaction with academics were predictive of student GPA. Furthermore, Young-Jones, Burt, Dixon, and Hawthorne (2013) asserted that student study skills and student self-efficacy were correlated with GPA. Young-Jones et al. also noted students' meetings with their academic advisor and the advisor's professionalism and availability were positively related to student study skills and student self-efficacy. The study by Young-Jones et al. highlights that another set of factors involving the academic context surrounding students may be crucial in determining academic success.

Other researchers found student perceptions of academic environments, including how students view their instructors, can have an impact on student success. For example, Black and Deci (2000) discovered that students who perceived instructors as supportive of student autonomy reported increased levels of autonomous regulation, perceived competence, and enjoyment of the course. Additionally, these students experienced decreased levels of anxiety as the semester progressed, which was predictive of better performance in the course.

Despite this volume of research conducted on student academic achievement, it has been difficult to identify the combination of factors best contributing to student success. In addition, it is important to consider that student success factors may depend in part on the type of students (i.e., first-generation status), some of whom may find academic achievement more difficult.

Challenges for First-Generation Students

Various characteristics of first-generation students may influence academic attainment. First-generation students, variously defined as students whose parents nor grandparents have not attained a college degree, or attended college at all, are more likely to be older, have dependents, and obtain lower GPAs than their

non-first-generation counterparts (Ward, Siegel, & Davenport, 2012). Additionally, first-generation undergraduates are typically unaware of what to expect during the application process, unlike their non-first-generation peers (Knighton & Mirza, 2002). Thus, when first-generation students begin their academic career, they are more likely to experience setbacks.

Overall, first-generation students tend to be less prepared when planning their academic careers (Pascarella, Pierson, Wolniak, & Terenzini., 2004), which may result in academic difficulties. For instance, DeAngelo et al. (2011) determined that only 27% of first-generation students graduated college within four years, whereas 42% of non-first-generation students successfully graduated within this time frame. Moreover, the gap remained roughly the same six years later (54.1% vs. 68.2%). Furthermore, Young-Jones et al. (2013) noted first-generation students reported lower self-efficacy compared to their undergraduate counterparts. Given that self-efficacy and competence can be both directly and indirectly linked (e.g., Bandura, 2012; Bandura & Schunk, 1981), a lack of self-efficacy can be particularly consequential within academia.

Considering that numerous researchers (e.g., Blackwell & Pinder, 2014; Jenkins, Belanger, Connally, Boals, & Durón, 2013; Bui, 2002) concluded that first-generation students differ from their peers, the exact differences are vital to identify. As described above, researchers have addressed a multitude of factors to understand the causes behind student academic outcomes for both groups. However, researchers often have limited their focus to only one or two aspects of the whole picture (e.g., perceived social support, academic motivation, or basic psychological needs). Therefore, in the present study, we examined the impact of fifteen factors on academic achievement as measured by student-reported GPA. These factors include motivation, the fulfillment of basic psychological needs (i.e., autonomy, competence, and relatedness), perceptions of social support, student study skills, and perceptions of stress. In addition, we investigated differences in the determinants of academic success between first-generation and non-first-generation students in terms of this combination of specific factors. To accomplish this task, we turned first to the Self-Determination Theory (SDT; Deci & Ryan, 1985, 2002; Ryan & Deci, 2000) of motivation.

The Current Study

Self-Determination Theory of Motivation. The model espoused by SDT describes motivation as the impetus for human action and ranges from intrinsic or internalized motivation to a complete lack of motivation (amotivation). Put succinctly, SDT proposes that motivation is determined by the level of goal internalization and control an individual has over their actions. Furthermore, Ryan and Deci (2000) report that for individuals to be intrinsically motivated the activity undertaken must be challenging, new, or hold intrinsic value. When intrinsic motivation fails, SDT suggests individuals may remain motivated if they are extrinsically driven.

Deci and Ryan (1985) described three types of extrinsic motivation ranging from the least to most externalized. Identified regulation is defined as motivation for external reasons that have been internalized as meaningful by the individual, i.e. performing an action because it is also important to the individual (Levesque, Copeland, Pattie, & Deci, 2010; Vallerand et al., 1992). Introjected regulation means performing an action because others have suggested the action is necessary (Ryan & Deci, 2000). Motivation because of external regulation involves doing something to gain a monetary reward or avoid a punishment (Deci, 1975; also, see Ryan & Deci, 2000, for a review). As an individual becomes less self-determined, motivation becomes less intrinsic and more extrinsic, and thus overall motivation decreases. According to Deci and Ryan, amotivation or a complete lack of motivation, is the result of a lack of self-determination.

Amotivation is defined as an absence of self-determination and results in behaviors that occur without any apparent intent (Deci & Ryan, 1985, 2002). Deci and Ryan (1985) argued that amotivation may arise from several sources, such as evaluations of competency (e.g., Bandura, 1986, 2006) or outcome expectancies (e.g., Seligman, 1975). According to Deci and Ryan (1985), amotivation occurs when the three basic psychological needs of competence, autonomy, and relatedness are thwarted. Thus, to gain a clearer understanding of the impact of these needs on both motivation and academic outcomes, it is crucial to explore them as well.

Satisfaction of basic psychological needs. Deci and Ryan (1985, 2000) proposed that intrinsic motivation stems from the fulfillment of an individual's competence, autonomy, and relatedness. According to these researchers, competence is realized when successfully completing a task or reaching a goal, and thus competence in an academic setting can be a student successfully completing an academic challenge. Supporting this proposal, researchers found successful engagement in educationally purposeful activities, or experiences of competence, is positively related to student grades and persistence (e.g., Faye & Sharpe, 2008; Ward et al., 2012).

Autonomy, according to SDT (Deci & Ryan, 1985, 2000), is characterized by self-regulation, or the ability to direct one's actions without interference from external sources. Within education, autonomy translates to perceptions of choice and self-direction in learning. Several researchers have found evidence supporting a positive relationship between autonomy and academic outcomes (e.g., Bol, Campbell, Perez, & Yen, 2016; Grolnick & Ryan, 1989; Vallerand, Fortier, & Guay, 1997; Wilson & Narayan, 2016).

Relatedness is the human tendency to form social bonds with others and is the third basic psychological need in SDT (Deci & Ryan, 2000; Ryan & Deci, 2000). According to SDT, relatedness functions as a facilitator for the internalization of goals important to one's group and is a prerequisite of intrinsic motivation. In the academic setting, students form new, social relationships that dictate how they relate to peers, roommates, professors, advisors, and even the campus community. If these associations are healthy, satisfying, and meaningful, then relatedness, and

by extension motivation, is more likely to flourish (e.g., Roorda, Koomen, Spilt, & Oort, 2011; Tessier, Sarrazin, & Ntoumanis, 2010).

Perceived social support and motivation. Social support outside of the school setting may also foster positive outcomes for students. For example, various forms of perceived social support correlate both directly (e.g., de la Iglesia, Stover, & Fernández Liporace, 2014; Young-Jones et al., 2013) and indirectly (via motivation, e.g., Young-Jones, Fursa, Byrket, & Sly, 2015) to academic success. Furthermore, Ryan and Deci (2000) noted that feelings of intrinsic motivation are more likely to occur when individuals are supported by those they value socially. Consequently, social support can also be significant for academic success through its impact on motivation.

Study skills. The role of study skills in postsecondary education has prompted significant research attention (e.g., Balduf, 2009; Fong et al., 2016). Balduf argued that universities expect students to have study skills upon admission. However, students may lack such preparedness for collegiate performance, illustrated by ineffective study habits and poor academic outcomes often recognized during the first semester (McGinley, Carlson, & Hoppe, 2008). Skills developed early in education no longer suffice because collegiate coursework is more demanding than in secondary education settings. Considering these pressures, it is unsurprising that students experience increased amounts of stress as they strive to obtain their academic goals.

Perceptions of stress. Stress has been considered a determinant of successful human functioning, as stress can influence both feelings of self-efficacy and competence (e.g., Arbona, 2016; Fong et al., 2016) as well as the fulfillment of the basic psychological needs mentioned in SDT (e.g., Ratelle, Simard, & Guay, 2013; Trevino & DeFreitas, 2014). The impact of stress on academic outcomes has also been explored both directly (e.g., Krumrei-Mancuso, et al., 2013; Shankar & Park, 2016) and indirectly (e.g., Adams, Meyers, & Beidas, 2016; Antaramian, 2017; Renshaw & Cohen, 2014). Stress in the academic setting is found in all areas, from enrollment to graduation. Furthermore, stress from outside the academic context (e.g., life events) can impact academic outcomes indirectly via changes in attentional capacity or commitment (e.g., Boyraz, Granda, Baker, Tidwell, & Waits, 2016; Samaha & Hawi, 2016; Ward et al., 2012).

Hypotheses. Despite the knowledge of factors influencing academic achievement, questions remain as to which factors are the most prevalent in combination. The present study utilized five instruments to assess various domains contributing to academic success. These domains include motivation (i.e., academic motivation, basic psychological needs) and factors that may enhance or disrupt it (perceived social support, personal study skills, and perceived stress). Consistent with previous literature exploring each of these measures individually, we hypothesized that higher levels of intrinsic motivation, social support, and

study skills, along with decreased amotivation and stress, would predict higher GPA. Furthermore, we hypothesized that first-generation students' GPA would be predicted by the same factors excluding study skills, as the study skills necessary for postsecondary success would be less likely to have been fostered in this group, compared to non-first-generation students (Ward et al., 2012).

Method

Data Collection Sites

Data were collected from one southern and one midwestern university over the course of one fall and one spring semester. Both universities are public universities that offer Bachelor's, Master's, and Doctoral degrees. The study was reviewed and approved by the Institutional Review Board at each site prior to data collection.

Southern University. This site had a fall 2016 enrollment of 12,385 students, who identified largely as White (46.9%), although a substantial portion of the student population identified as African American (21.5%) or Hispanic (16.8%). In the fall 2015 semester this university had a 1-year student retention rate of 64.4% (Texas Higher Education Coordinating Board, 2017). The Carnegie Classification of Institutions ([CCI], 2017) lists this university as a Doctoral university with higher research activity.

Midwestern University. This university had a fall 2016 enrollment of 23,538 students. The top three ethnicities reported by students included White (80.1%), African American (3.9%), and two or more ethnic backgrounds (3.3%). In the fall 2015 semester this university had a 1-year student retention rate of 79.4% (Missouri State University, 2017) and is classified as a larger program Master's university (CCI, 2017).

Participants

In total, data for 345 participants were collected. Participants were predominantly female (87.4%), identified as White (38.8%), classified as freshmen (36.5%), and were non-first-generation students (63.5%). The mean age of participants was 21.13 years, with a standard deviation (SD) of 4.69 years.

Southern University. A total of 236 undergraduate students completing courses in the psychology department participated either for partial credit towards course requirements or for extra credit. This sample consisted of 189 females and 47 males with a mean age of 21.58 years (SD = 5.33). One hundred participants were first-generation, whereas 105 participants were transfer students.

Midwestern University. One hundred and nine psychology undergraduate

students participated either for partial credit towards course requirements or for extra credit. Of these, 75 participants were female and 34 were male, with a mean age of 20.15 years (SD = 2.61). Twenty-six participants from this site were first-generation and 21 were transfer students.

Measures

Academic Motivation Scale. Intrinsic motivation (to know, to accomplish things, and to experience stimulation), extrinsic motivation (identified regulation, introjected regulation, and external regulation), and amotivation were assessed using the Academic Motivation Scale (AMS; Vallerand et al., 1992). Responses to the four items of each subscale are given in a Likert format ranging from 1 to 7, and total subscale responses may range from 4 to 28. In the present study, Cronbach's α for each subscale was: to know, .87; to accomplish things, .88; to experience stimulation, .85; identified regulation, .71; introjected regulation, .83; external regulation, .81; and amotivation, .86.

Basic Needs Satisfaction at College Scale. The fulfillment of basic psychological needs was measured using the Basic Needs Satisfaction at College Scale (BNSC-S; Jenkins-Guarnieri, Vaughan, & Wright, 2015). The BNSC-S allows researchers to examine impacts of each of the three needs of autonomy, competence, and relatedness for students at postsecondary institutions. The subscales for autonomy and relatedness each contain four questions, whereas the subscale for competence has five questions. Each question is presented in a 1 to 7 Likert format, with the total average subscale response ranging from 1 to 7. In the present study, Cronbach's α for each subscale was: autonomy, .66; competence, .66; and relatedness, .70.

Multidimensional Scale of Perceived Social Support. Perceptions of social support were assessed using the Multidimensional Scale of Perceived Social Support (MSPSS; Zimet, Powell, Farley, Werkman, & Berkoff, 1990). The MSPSS allows for an assessment of an individual's perception of social support from three specific sources: family members, friends, and a significant other. Four questions make up each subscale, and participants respond to each on a Likert scale ranging from 1 to 7. The average for each subscale may range from 1 to 7. Cronbach's α for each subscale in the present study was: family members, .91; friends, .92; and significant other, .95.

Study Skills. Study skills were measured using the scale utilized by Young-Jones et al. (2013). A total of nine questions were used to assess these aspects of student study skills, with responses ranging from 1 to 7, and an average scale score with this same range. Cronbach's α for this scale in the present study was .63.

Perceived Stress Scale. Student perceptions of stress were assessed using the Perceived Stress Scale (PSS) developed by Cohen, Kamarck, and Mermelstein

(1983). The PSS is a 10-item scale that asks respondents to rate how often they experienced stress within the previous month, with responses ranging from 0 to 4. The total score on this scale ranges from 0 to 40, and Cronbach's α for this scale in the present study was .88.

Procedure

Data collection was conducted in-person for each collection site, and all surveys were completed in one self-paced session. Materials were administered through the online survey tool SurveyGizmo (http://www.surveygizmo.com), and random order was utilized for each participant. Additionally, participants completed an attention check question within the MSPSS measure to ensure they understood and were following instructions. Lastly, participants answered the demographic and GPA questionnaire.

Results

Descriptive Statistics

Of the 345 total participants' data, 27 were classified as freshmen or transfer students who had yet to earn a GPA and were removed prior to any data analyses. Of the remaining 318 participants' data, 13 (4.1%) were removed due to failing the attention check, and three (0.9%) were removed for failing to complete the study. Removal resulted in a total of 302 responses (i.e., 95% of 318 participants with a reported GPA) available for subsequent analyses. Frequencies and descriptive statistics for various demographic characteristics and for GPA are presented in Table 1.

Data Analysis

The means, standard deviations (SD), and ranges for all 15 factors and reported GPA are presented in Table 2. Data analysis consisted of: (a) overall data screening and assumption checks; (b) group comparisons by data collection site and demographics to determine if significant differences in GPA existed based on these factors, and (c) multiple regression analyses.

Data screening. Missing values analyses revealed that no variables contained missing values greater than 4%. Values were further analyzed using Little's (1988) missing at random (MCAR) test and were found to be nonsignificant (χ^2 = 220.93, p = .185). Because of the findings of the MCAR analysis, missing values were replaced using a Multiple Imputation (MI) procedure with a total of 20 imputations (Enders, 2010). Assessment of univariate outliers was performed using a 1.5 interquartile range threshold as well as by assessing the median absolute deviation (MAD; Leys, Ley, Klein, Bernard, & Licata, 2013). Using both methods,

TABLE 1

Demographic Frequencies and Descriptive Statistics by Data Collection Site

Demographic	Southern University	Midwestern University	Total
n	198	104	302
Mean Age	21.90 (5.53)	20.17 (2.60)	21.30 (4.80)
Mean Reported GPA	3.22 (0.60)	3.25 (0.57)	3.23 (0.59)
Biological Sex			
Female	160	73	233
Male	38	31	69
Ethnicity			
White	72	54	126
African American	45	5	50
Asian American	3	3	6
Hispanic	38	1	39
Two or More	10	5	15
Other	30	36	66
Classification			
Freshman	43	56	99
Sophomore	48	16	64
Junior	67	9	76
Senior	40	23	63
First-Generation Students	87	25	112
Transfer Students	94	21	115
First-Generation Transfer Students	42	6	48

Note. Standard Deviations in parenthesis.

TABLE 2

Means, Standard Deviations, Minimums, and Maximums for all Variables

Variables	Mean	Standard Deviation	Minimum	Maximum
1. GPA	3.23	0.59	0.00	4.00
2. EM - External Regulation	23.37	4.60	5	28
3. EM - Identification	24.11	3.50	8	28
4. EM - Introjected Regulation	22.38	4.72	4	28
5. IM - To Know	21.82	4.78	4	28
6. IM - To Accomplish Things	20.82	5.22	4	28
7. IM - To Experience Stimulation	15.56	5.84	4	28
8. Amotivation	6.87	4.29	4	22
9. Perceived Stress	20.43	7.20	2	38
10. Relatedness	3.27	0.78	1.25	4.75
11. Competence	3.31	0.70	1.20	4.60
12. Autonomy	4.01	0.70	1.75	5.00
13. Support - Sig. Other	5.75	1.59	1.00	7.00
14. Support - Friends	5.74	1.23	1.00	7.00
15. Support - Family	5.68	1.38	1.00	7.00
16. Study Skills	4.49	0.91	1.96	6.41

Note. EM = Extrinsic Motivation; IM = Intrinsic Motivation.

two (0.67%) responses were identified as univariate outliers on more than 33% of the factors and were removed prior to further analyses.

Descriptive statistics analyses revealed that responses to eight of the factors displayed acceptable values of skewness and kurtosis (between plus or minus one), whereas the remaining eight factors and reported GPA demonstrated levels of these values beyond acceptable limits. Normality was assessed for these eight variables using a Kolmogorov-Smirnov test, which revealed a significant departure from normality for all submitted variables (all *ps* < .001). To address normality issues, these variables were transformed following Howell's (2007) recommendations, and subsequent descriptive statistics analyses revealed acceptable levels of skewness and kurtosis.

Assessment of multivariate outliers was determined by computing the Mahalanobis distance for each case on the 16 continuous variables. Four cases were identified as outliers via this method and were removed prior to additional analyses. Thus, the final number of available cases for data analysis following screening was 296. Despite the removal of both the univariate and multivariate outliers, analyses revealed the statistical significance of the findings reported below were not altered.

Data collection site and demographic comparisons. The next step of data analysis involved uncovering any significant differences for GPA between data collection sites. The results of an initial one-way between-subjects analysis of variance (ANOVA) revealed no significant difference in GPA between data collection sites, $F(1, 294) = .273$, $p = .602$. Despite this outcome, it should be noted that the demographics of each sample were not the same. Specifically, Chi-squared tests revealed statistically significant differences between the sites in relation to ethnicity ($\chi^2 = 45.84$, $p < .001$), first-generation student status ($\chi^2 = 12.35$, $p < .001$), academic classification ($\chi^2 = 38.25$, $p < .001$), and transfer student status ($\chi^2 = 19.63$, $p < .001$). Taking into consideration the known differences between these various groups on academic outcomes (e.g., Ward et al., 2012), identifying any differences in GPA based on these factors in the present study was important. Therefore, these demographic variables were used as covariates in a subsequent analysis of covariance (ANCOVA), which revealed an overall significant model $F(5, 290) = 2.48$, $p = .032$, (adjusted $R^2 = .024$) with first-generation student status as the sole significant factor $F(1, 290) = 6.205$, $p = .013$ (all other *ps* > .05). Given the previously mentioned differences between first-generation and non-first-generation students, this finding was not unexpected and was explored further with additional analyses using first-generation student status as the construct of interest.

A series of ANOVAs were performed with all 15 factors and GPA as within-subjects variables and first-generation status as a between-subjects variable. Analyses revealed that first-generation students reported lower levels of introjected regulation, $F(1, 294) = 6.089$, $p = .014$, $\eta_p^2 = .020$ and GPA, $F(1, 294) = 5.674$, $p = .018$, $\eta_p^2 = .019$, along with higher levels of intrinsic motivation to accomplish things, $F(1, 294) = 3.913$, $p = .049$, $\eta_p^2 = .013$ than their non-first-generation peers. Lower levels of extrinsic motivation and GPA, in concert with higher levels of

intrinsic motivation, would be expected for first-generation students given this group's lack of experience with academia and their initial experiences in this setting potentially being more novel than experiences of their peers. Having completed data screening and group comparisons, we next proceeded to the final data analysis phase of multiple regression.

Multiple regression analysis. Three measures of extrinsic motivation (identified regulation, introjected regulation, and external regulation), three measures of intrinsic motivation (to know, to accomplish things, and to experience stimulation), a measure of amotivation, self-reported perceptions of stress, self-reports of fulfillment of three basic psychological needs (autonomy, competence, and relatedness), self-reports of three forms of social support (from a significant other, from family, and from friends), and self-reported study skills were entered into a simultaneous linear regression analysis to predict self-reported GPA in postsecondary students. The first model consisted of all cases, and correlations for the variables entered are shown in Table 3 (see Appendix), along with their respective significance levels.

The regression model was statistically significant, $F(15, 280) = 4.828$, $p < .001$, and accounted for 16.3% of the variability in self-reported GPA ($R^2 = .205$, adjusted $R^2 = .163$). Seven of the fifteen factors reached conventional significance levels, with lower levels of amotivation, introjected and external regulation extrinsic motivation, and self-reported study skills, along with higher levels of identified regulation, autonomy, and support from a significant other predicting self-reported GPA. The factors of amotivation and introjected regulation received the most weight in the model. Given high correlations between the predictors, the unique variance explained by each variable was low as measured by the squared semi-partial correlations. Raw and standardized regression coefficients for this model are presented in Table 4.

Another simultaneous linear regression analysis using the same factors for only first-generation students was performed, and correlations and significance levels for these variables are shown in Table 5 (see Appendix).

This regression model was statistically significant, $F(15, 95) = 3.100$, $p < .001$, and accounted for 22.2% of the variability in self-reported GPA ($R^2 = .328$, adjusted $R^2 = .222$). In this model, four factors were statistically significant, and results revealed that lower levels of amotivation and social support from friends combined with higher levels of intrinsic motivation toward accomplishment and support from a significant other predicted self-reported GPA. Deviating again from the previous model, intrinsic motivation toward accomplishment and support from a significant other were the two most weighted variables in the first-generation student model. Similar to the previous regression model, the variables in the first-generation student model also exhibited high correlations, resulting in low levels of unique variance explained. Raw and standardized regression coefficients for the first-generation student regression model are presented in Table 6.

TABLE 4

Regression Table for all Participants *(n = 296)*

Variables	B	SE of B	β	sr^2	Structure Coefficients
Constant	1.684	0.180			
EM - External Regulation	-0.030	0.015	-0.132*	0.01	-0.24
EM - Identification	0.045	0.022	0.160*	0.01	0.20
EM - Introjected Regulation	-0.045	0.018	-0.192*	0.02	-0.27
IM - To Know	0.003	0.004	0.068	0.00	-0.10
IM - To Accomplish Things	-0.001	0.004	-0.016	0.00	-0.06
IM - To Experience Stimulation	-0.003	0.003	-0.093	0.00	-0.16
Amotivation	-0.450	0.160	-0.199**	0.02	-0.58
Perceived Stress	0.002	0.002	0.076	0.00	0.53
Relatedness	-0.029	0.017	-0.106	0.01	-0.41
Competence	-0.042	0.025	-0.139	0.01	-0.52
Autonomy	0.049	0.023	0.159*	0.01	-0.20
Support - Sig. Other	0.073	0.028	0.159**	0.02	0.34
Support - Friends	-0.047	0.037	-0.082	0.00	0.08
Support - Family	-0.001	0.032	-0.002	0.00	0.16
Study Skills	-0.032	0.013	-0.137*	0.02	-0.29

Notes. EM = Extrinsic Motivation; IM = Intrinsic Motivation; SE = Standard Error; sr^2 = squared semi-partial correlations.

The dependent variable was self-reported GPA. $R^2 = .205$, adjusted $R^2 = .163$.
$^{*}p < .05$, $^{**}p \leq .01$

Discussion

In the present study, we sought to determine which combination of factors shown to affect motivation are most predictive of GPA for undergraduate students. We hypothesized that higher levels of intrinsic motivation, social support, and study skills, along with lower levels of amotivation and stress, would be predictive of GPA for all students. This hypothesis was partially supported, as higher levels of social support from a significant other and lower levels of amotivation were

TABLE 6

Regression Table for First-Generation Students ***(n = 111)***

Variables	B	SE of B	β	sr^2	Structure Coefficients
Constant	1.534	0.295			
EM - External Regulation	-0.041	0.029	-0.175	0.01	-0.10
EM - Identification	0.058	0.043	0.212	0.01	0.29
EM - Introjected Regulation	-0.035	0.035	-0.142	0.01	-0.17
IM - To Know	-0.011	0.007	-0.243	0.02	-0.12
IM - To Accomplish Things	0.017	0.007	0.389*	0.04	0.10
IM - To Experience Stimulation	-0.001	0.004	-0.035	0.00	-0.03
Amotivation	-0.629	0.276	-0.281*	0.04	-0.58
Perceived Stress	0.004	0.003	0.139	0.01	0.49
Relatedness	-0.041	0.028	-0.151	0.02	-0.39
Competence	0.011	0.040	0.036	0.00	-0.33
Autonomy	0.016	0.038	0.050	0.00	-0.27
Support - Sig. Other	0.145	0.048	0.316**	0.06	0.40
Support - Friends	-0.128	0.060	-0.230*	0.03	0.09
Support - Family	0.039	0.050	0.080	0.00	0.19
Study Skills	-0.022	0.022	-0.091	0.01	-0.13

Notes. EM = Extrinsic Motivation; IM = Intrinsic Motivation; SE = Standard Error; sr^2 = squared semi-partial correlations.

The dependent variable was self-reported GPA. $R^2 = .328$, adjusted $R^2 = .222$.
$^{*}p < .05$, $^{**}p \leq .01$

both significant predictors of GPA. Contrary to this hypothesis, however, analyses revealed that lower levels of externally regulated extrinsic motivation, introjection regulated extrinsic motivation, and study skills along with higher levels of identified extrinsic motivation and autonomy were also significant predictors.

Findings inconsistent with the hypothesis are somewhat surprising for several

reasons. Although lower levels of both externally regulated and introjection regulated extrinsic motivation would be desirable in college students, higher levels of identified extrinsic motivation as a significant predictor of GPA is intriguing. That is, there appears to be a benefit for students whose motivation initially becomes externally oriented but remains partially internalized. However, consistent with tenets put forth by Self-Determination Theory (SDT; Deci & Ryan, 1985, 2002), lower GPA may result for students whose motivation continued to become more extrinsic to the point of being introjected or externally regulated or for students whose motivation develops into complete amotivation. An additional inconsistent finding was the negative relationship identified between study skills and GPA. Yet, it should be noted that our measure of study skills represented students' perceptions of their own study skills, which may have been inflated. Viewed in this manner, these results suggest that higher levels of overconfidence in study skills may result in detrimental effects on GPA, a result consistent with prior research (e.g., Bercher, 2012).

According to SDT, students with greater levels of intrinsic motivation should experience better academic outcomes, yet we found that none of these were significant predictors of GPA. Considering that the means reported for each of the intrinsic motivation measures were lower than means for the extrinsic measures suggests students sampled in this study were primarily extrinsically motivated. Furthermore, the purported importance of the basic psychological needs of autonomy, competence, and relatedness as prerequisites of intrinsic motivation can help explain this apparent lack of intrinsic motivation. That is, although each of the psychological needs variables were significantly correlated with measures of intrinsic motivation, only autonomy was a significant predictor of GPA. Thus, if neither competence nor relatedness needs are being met, intrinsic motivation could be hindered (Deci & Ryan, 1985). Moreover, as Ryan and Deci (2000) pointed out, intrinsic motivation may not occur for an activity that is not new or does not hold intrinsic value to the individual. Non-first-generation students may therefore be less likely to experience intrinsic motivation in the postsecondary setting.

Since first-generation students face additional pressures and obstacles to their academic success than their non-first-generation peers, we hypothesized that higher levels of intrinsic motivation and social support in addition to lower levels of amotivation and stress would be predictive of GPA for these individuals. This hypothesis was also partially supported, as higher levels of intrinsic motivation to accomplish tasks and support from a significant other in addition to lower levels of amotivation and support from friends were significant predictors of GPA. In contrast to the previous model, first-generation student GPA appears to be less influenced by extrinsic motivation or perceptions of study skills, possibly because of a lack of experience(s) on the part of these students by which to be influenced. Findings regarding motivation are congruent with research by Ryan and Deci (2000) who suggested that new or challenging experiences are a prerequisite for intrinsic motivation. Nevertheless, results of the present study suggest that first-generation students' academic success may be hindered by perceived support from

friends, an issue less significant in the previous model.

Other intriguing findings in the present study include the impact of the three basic psychological needs on first-generation students and the support that all students feel they receive from significant others. As in the initial model, measures of first-generation students' basic psychological needs were significantly correlated with intrinsic motivation but were themselves not significant predictors of GPA. Compared to their peers, first-generation students may have not yet experienced a sufficient number of successful academic challenges to develop perceptions of competence, not yet developed the skills or had adequate opportunities to experience autonomy, and may have yet to form social bonds necessary to experience perceptions of relatedness. Nevertheless, higher levels of social support from a significant other were significant predictors of higher GPA for both models in the present study. These findings may help to explain the possible lack of basic psychological needs fulfillment while motivation remained a significant predictor. That is, because of the effects of social support, particularly from an individual that would be highly socially valued, motivation was able to persist when students felt that their basic psychological needs in college were not being satisfied. Similarly, it could be that because of these reduced levels of needs satisfaction, some students became motivated to obtain such needs (Sheldon & Gunz, 2009), although such a conclusion would require a more direct evaluation.

Limitations and Directions for Future Research

Several groups in the present sample were underrepresented. For example, both Asian Americans and individuals who identified as multiracial represented less than 1% of the current sample. Given that Asian Americans may face stereotypical perceptions of high levels of competence (Fiske, Cuddy, Glick, & Xu, 2002), these individuals may face increased pressures to perform, and thus their academic success may be predicted differently than those students represented here. Similarly, the motivational and social support factors that, together, predict academic success for those students who identify as multiracial may be substantially different from those students in the present study, as such individuals would potentially face unique forms of bias or difficulties forming new social identities (Shih & Sanchez, 2009). Therefore, the combination of factors that predict academic success for these individuals is a central topic of future study. In a similar vein, first-generation students represented 37% of the sample in the present study. Given that researchers identified unique challenges for these students, additional studies focused solely on the combination of factors that predict successful academic achievement for these individuals should be considered.

Another group limitation is the over-representation of female students in the study. Male students may have different motivations for attending college and may be less likely to view academic achievement as being of value (Shekhar & Devi, 2012). When examining academic motivation between males and females, Brouse, Basch, LeBlanc, McKnight and Lei (2010) found differences in intrinsic motivation, with females reporting more intrinsic motivation than males. Additionally, females

scored higher in extrinsic motivation whereas males scored higher in amotivation. Overall, the differences in motivation imply that motivational differences could result in better academic performance for females compared to males. However, it is worth noting that a one-way ANOVA revealed no difference in GPA between female and male students in the current study ($F = .027$, $p = .433$).

Recruiting participants from undergraduate psychology courses also might have influenced the results. Shekhar & Devi (2012) found differences in motivation based on area of study, with students in the Sciences reporting higher academic motivation than students in the Social Sciences. This supported findings by Upadhyay and Tiwari (2009) that showed a similar pattern of motivational differences between disciplines. Therefore, researchers may wish to include participants in future studies to determine if this pattern remains reliable.

Sample sizes may also impose limitations on the study. For example, in addition to the factors explored here, other factors have been identified as being essential for academic success (e.g., social integration; Tinto, 1993). However, given the combination of potential participant fatigue and a reduction in the predictive power of a regression model with a large number of factors (Miles & Shevlin, 2001), such factors were excluded from the present study. Alternatively, structural equation modelling (SEM) is an additional tool that could be useful for determining the ways in which the proposed factors influence students' academic success. Although the present study did not use SEM due to the statistical limitations caused by current sample sizes and the resultant potential for low effect sizes (Weston & Gore Jr, 2006), future research using SEM could provide additional insight into the connections between the factors proposed to influence academic success.

A further limitation includes using self-reported GPA as a measure of academic success. Other measures such as graduation rates and official university records of GPA reduce potential reporting biases and increase accuracy. Despite this fact, self-reported GPA correlates with official records of GPA (Caskie, Sutton, & Eckhardt, 2014; Noftle & Robins, 2007), and measuring GPA in the current study allowed an analysis of the experiences and perceptions of those students who may not complete their academic degree.

Summary

In the present study, we found motivational differences between first-generation and non-first-generation students. Accordingly, interventions aimed at promoting academic success should be tailored differently depending upon the population of interest, unless such interventions target a complete lack of motivation, from which all students would appear to benefit. Additionally, our results indicate that once students gain experience in academia, perceptions of their own study skills may lead to decreased GPA, and therefore interventions aimed at helping all students more accurately gauge these skills may be beneficial. Lastly, interventions for students who do not have the support of a significant other may be beneficial, as our findings indicate that such support is vital for student success.

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TABLE 3

Correlations of the Variables for the Regression Model *(n = 296)*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. GPA		-11*	09	-12*	-05	-03	-07	-26***	24***	-19***	-24***	-09	15**	04	07*
2. EM - External Regulation	-11*		50***	43***	-15**	-25***	-04	-15**	-07	-03	-08	-08	14**	13*	23***
3. EM - Identification	09	50***		54***	-49***	-51***	-32***	-47***	12*	-17**	-35***	-41***	16**	28***	32***
4. EM - Introjected Regulation	-12*	43***	54***		-49***	-63***	-36***	-19***	02	-04	-23***	-23***	08	22***	23***
5. IM - To Know	-05	-15**	-49***	-49***		73***	63***	30***	-07	20***	45***	41***	-08	-23***	-22***
6. IM - To Accomplish Things	-03	-25***	-51***	-63***	73***		57***	26***	-09	16**	41***	38***	-15**	-17***	-26***
7. IM - To Experience Stimulation	-07	-04	-32***	-36***	63***	57***		11**	-09	13*	38***	29***	04	-08	-06
8. Amotivation	-26***	-15**	-47***	-19***	30***	26***	11**		-34***	25***	49***	47***	-21***	-32***	-32***

TABLE 3 (CONT.)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
9. Perceived Stress	24	-07	12*	02	-07	-09	-09	-34***		-23***	-44***	-19***	12*	15**	
10. Relatedness	-19	-03	-17***	-04	20***	16**	13*	25***	-23***		46***	43***	-14**	-25***	
11. Competence	-24	-08	-35***	-23***	45***	41***	38***	49***	-44***	46***		55***	-14**	-31***	
12. Autonomy	-09	-08	-41***	-23***	41***	38***	29***	47***	-19***	43***	55***		-28***	-37***	
13. Support - Sig. Other	15[b]	14**	16**	08	-08	-15**	04	-21***	12*	-14**	-14**	-28***		37***	
14. Support - Friends	04	13*	28***	22***	-23***	-17***	-08	-32***	15**	-25***	-31***	-37***	37***		
15. Support - Family	07	23***	32***	23***	-22***	-26***	-06	-32***	23***	-16**	-29***	-27***	34***	41***	
16. Study Skills	-13*	06	08	01	04	-03	-02	-05	-03	0	-04	-09	01	04	

Notes. Correlation coefficients shown have been rounded to the nearest 2 decimal places, with the decimal omitted.
EM = Extrinsic Motivation; IM = Intrinsic Motivation.
*$p < .05$, **$p \leq .01$, ***$p \leq .001$

TABLE 5

Correlations of the Variables for the First-Generation Student Regression Model *(n = 111)*

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. GPA		-06	16*	-10	-07	06	-02	-33***	28**	-22**	-19*	-15	23**	05	11
2. EM - External Regulation	-6		61***	57***	-35***	-40***	-21*	-25*	-12	-17*	-11	-24**	28***	15	28**
3. EM - Identification	16*	61***		64***	-56***	-54***	-38***	-54***	20*	-31***	-39***	-50***	30***	38***	32***
4. EM - Introjected Regulation	-10	57***	64***		-54***	-68***	-40***	-25**	09	-14	-33***	-35***	23**	21**	32***
5. IM - To Know	-7	-35***	-56***	-54***		76***	60***	30***	-12	21*	41***	32***	-11	-19*	-20*
6. IM - To Accomplish Things	6	-40***	-54***	-68***	76***		48***	34***	-16*	23**	43***	35***	-28**	-23**	-28**
7. IM - To Experience Stimulation	-2	-21*	-38***	-40***	60***	48***		13	-14	12	30***	20**	06	0	03
8. Amotivation	-33***	-25*	-54***	-25**	30***	34***	13		-38***	26**	52***	51***	-24**	-33***	-25**

TABLE 5 (CONT.)

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
9. Perceived Stress	28**	-12	20*	09	-12	-16*	-14	-38***		-25**	-46***	-19*	09	16	20*
10. Relatedness	-22**	-17*	-31***	-14	21*	23**	12	26**	-25**		45***	42***	-21*	-22**	-23**
11. Competence	-19*	-11	-39***	-33***	41***	43***	30***	52***	-46***	45***		56***	-18*	-23**	-26**
12. Autonomy	-15	-24**	-50***	-35***	32***	35***	20**	51***	-19*	42***	56***		-30***	-36***	-25**
13. Support - Sig. Other	23**	28***	30***	23**	-11	-28**	6	-24**	9	-21*	-18*	-30***		47***	33***
14. Support - Friends	05	15	38***	21**	-19*	-23**	0	-33***	16	-22**	-23**	-36***	47***		40***
15. Support - Family	11	28**	32***	32***	-20*	-28**	3	-25**	20*	-23**	-26**	-25**	33***	40***	
16. Study Skills	-08	06	11	0	10	04	04	-02	09	-17*	-12	-10	-03	07	06

Notes. Correlation coefficients shown have been rounded to the nearest 2 decimal places, with the decimal omitted.
EM = Extrinsic Motivation; IM = Intrinsic Motivation.
$^{*}p < .05$, $^{**}p \leq .01$, $^{***}p \leq .001$