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Differences Between First-Generation and Continuing-Generation College Students in Psychological Need Fulfillment, Academic Engagement, and Retention

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DIFFERENCES BETWEEN FIRST-GENERATION AND CONTINUING-GENERATION COLLEGE STUDENTS IN PSYCHOLOGICAL NEED FULFILLMENT, ACADEMIC ENGAGEMENT, AND RETENTION

By

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DIFFERENCES BETWEEN FIRST-GENERATION AND CONTINUING-GENERATION COLLEGE STUDENTS IN PSYCHOLOGICAL NEED FULLFILLMENT, ACADEMIC ENGAGEMENT, AND RETENTION

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ABSTRACT

DIFFERENCES BETWEEN FIRST-GENERATION AND CONTINUING-GENERATION COLLEGE STUDENTS IN PSYCHOLOGICAL NEED FULFILLMENT, ACADEMIC ENGAGEMENT, AND RETENTION

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First-generation college students (FGCS) often struggle to find academic success unlike continuing-generation college students (CGCS) who often obtain higher GPA by the end of the semester. Using self-determination theory (SDT) as a lens, differences between FGCS and CGCS both at the beginning and end of the semester were investigated. Measures included psychological need fulfillment (autonomy, competence, relatedness), academic self-regulation (relative autonomy index), stress, academic engagement (learning involvement), academic performance (GPA), and retention. Between groups *t*-tests were used to assess differences in FGCS and CGCS, whereas multiple regression analyses were conducted to test relationships among the measured variables. FGCS reported being more stressed than CGCS. Psychological need fulfillment significantly predicted higher academic self-regulation and lower stress. Academic self-regulation and lowered stress significantly predicted higher academic engagement. Academic engagement significantly predicted academic performance, but did not predict retention. Implications for these results help to reinforce that by increasing psychological need fulfillment within students, stress can be reduced and academic self-regulation along with academic engagement can increase leading students to perform better in college.

DEDICATION

This thesis is dedicated to my family: James, Terry, and Jimmy Holt. Thank you for always being proud of me and encouraging me to continue my education. I dedicate this thesis to my patient and wonderful partner, Natalie George, for always believing that I can do anything. Your constant support and love have helped me through countless lonely nights. I love you all…

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This thesis follows the format prescribed by the *Publication Manual of the American Psychological Association* (7th ed.) and the Department of Psychological Science.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

INTRODUCTION

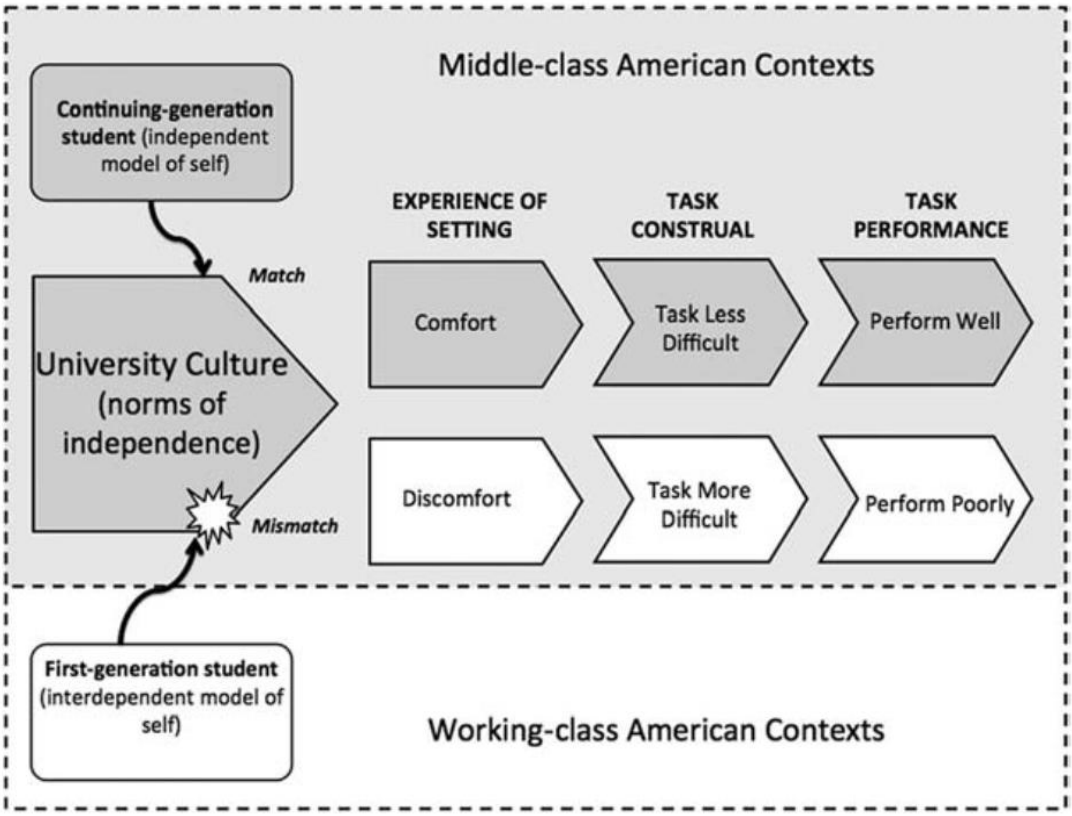
First-generation college students (FGCS) are "students who enrolled in postsecondary education and whose parents do not have any postsecondary education experience" (Redford et al., 2017, p. 2). Typically, they also come from low-income socioeconomic status, but this is not required to be labeled first-generation. It is also shown that an increase of FGCS are entering into higher education who are Latino/a (Redford et al., 2017; Trevino & DeFreitas, 2014). What is evident across all FGCS is that they usually have much lower cultural capital, meaning that these students do not understand the "rules of the game," compared to their peers in the context of academia. This lack of academic cultural capital stems from FGCS developing more interdependent characteristics (e.g., being responsive to others, connecting to and working with others, being part of a community) which is most likely based on their work and family/community focused lifestyles, which tends to be a mismatch for the independent (e.g., paving one's own path, expressing oneself, becoming an independent thinker) sphere of academia (Stephens et al., 2012). As FGCS appear to struggle with the cultural norms of transitioning to a college academic context, other students comparatively thrive.

All students who are not considered FGCS are then labeled as continuing-generation college students (CGCS) which are students "with at least one parent with a bachelor's degree or a higher level of educational attainment" (Redford et al., 2017, p. 2). Typically, CGCS do not come from a low-income socioeconomics status; this is because with parents holding higher education degrees they are given the opportunity to better paying careers and positions (Redford et al., 2017; Stephens et al., 2012). CGCS are overabundantly white with percentages ranging from over half at 52% and up to 80% of sample demographics, but other ethnicities are

represented in the overall literature demographics (Garriott et al., 2015; Redford et al., 2017; Stephens et al., 2012; Stephens et al., 2014). Repeatedly, CGCS perform much better in academic settings when compared with FGCS. Research suggests this is due to CGCS having more access to resources and people to better teach them the academic norms that give them such an increase of cultural capital within academia (Garriott et al., 2015; Mitchall & Jaeger, 2018; Stephens et al., 2012). Having a parent or two who have already gone through the college experience enables them to act as a guide for their children. This grooming that occurs leads to a development of more independent characteristics which blends well and matches with the independent culture of academia (Stephens et al., 2012; Torres & Solberg, 2001). This understanding of the "rules of the game" leads CGCS to feel much more confident in the academic context when compared with FGCS. This can be better understood by Stephens and colleagues (2012) cultural mismatch theory as illustrated in Figure 1.

Figure 1

Cultural Mismatch Theory



Note. Model of the divergent pathways that can occur with students' cultural norms and the university's cultural norm. Copyright © 2012 by American Psychological Association. Reproduced with permission. From "Unseen Disadvantage: How American Universities' Focus on Independence Undermines the Academic Performance of First-Generation College Students," by N. M. Stephens, S. A. Fryberg, H. R. Markus, C. S. Johnson, and R. Covarrubias, 2012, Journal of Personality and Social Psychology (Volume 102, Issue 6), p. 1182 https://doi.org/10.1037/a0027143.

FGCS are considered an academic minority and by helping to improve their status this helps institutional diversity and allows new, different ideas to permeate through into the academic culture (Stephens et al., 2012; Stephens et al., 2014; Wibrowski et al., 2017). It can better teach other students the importance of differences and how that changes a person's worldview (Stephens et al., 2014). In general, FGCS are more collaborative because they use more of their interdependent characteristics, like learning to listen to others and knowing how to efficiently work on a team, and to move forward through problems with others. This is something that CGCS easily adapt to helping both populations (Stephens et al., 2012).

One difficulty is retention among FGCS. There have been efforts to improve FGCS retention through differing interventions to better allow the students to thrive in academia, but statistically, FGCS have a higher attrition rate (77%) than CGCS (45%) with the goal of obtaining a bachelor's degree (Redford et al., 2017). Research has suggested multiple explanations for the higher attrition rates. FGCS are often working while attending college (sometimes two jobs) to help provide for their family (Antonelli et al., 2020; Stephens et al., 2012). Feelings of not belonging or isolation are also common so FGCS may instead drop out (Azmitia et al., 2018). Students who do poorly academically in the first semester are shown to drop out more and stressors dealing with the financial aspect can be overwhelming to FGCS who may be afraid that they will not be able to pay their way through college (D'Lima et al., 2014). A goal that every institution seeks is to have FGCS enrolled past one year at the university. If FGCS can be enrolled for more than a year then it seems to be more positive that they will complete their degree (Stephens et al., 2012; Stephens et al., 2014; Wibrowski et al., 2017).

Some of the best ways to improve FGCS success has been in a direct manner where an intervention is incorporated into the semester that involves FGCS. Interventions ranging from

receiving an interdependent or independent-focused college acceptance letters (Stephens et al., 2012), to attending a symposium highlighting the importance of differing backgrounds (Stephens et al., 2014), to fully established summer skills training programs involving college preparatory coursework, self-regulation study skills, critical thinking, writing skills, goal setting, self-monitoring and wellness, academic and financial counseling, summer retreat to meet administrative and faculty staff, to ongoing support into the first semester of college (Wibrowski et al., 2017) have all been used to better support FGCS and their success. Results from fully developed summer skills training programs show an increase in autonomous self-regulation, learning strategies, resource management, increase in mastery goal orientation, and a higher academic achievement when compared to non-summer program students (Wibrowski et al., 2017). A peer mentoring program to help guide first year FGCS has also become popular as a great way to better teach the "rules of the game" and the thought process needed to excel in academia while also increasing a student's relatedness need to feel connected with others (Hilts et al., 2018; Young & Keup, 2018). The development that is occurring within these programs are the fulfillment of psychological needs, which have been shown to enhance self-regulation, engagement, and academic achievement.

Psychological Needs and Academic Success

The fulfillment of psychological needs is a well-documented one popularized by Deci and Ryan (2000) who expresses that every individual has three basic psychological needs that must be fulfilled for ongoing growth and development; these needs are competence, relatedness, and autonomy. It is also important to understand how these authors meant for them to be understood:

> Competence…a deeply structured effectance-focused motivation – a propensity to have an effect on the environment as well as to attain valued outcomes within it…Relatedness refers to the desire to feel connected to others – to love and care, and to be loved and cared for…Autonomy refers to volition – the organismic desire to self-organize experience and behavior and to have activity be concordant with one's integrated sense of self…it is often incorrectly equated with the ideas of internal locus of control, independence, or individualism (see, e.g., Deci, Koestner, & Ryan, 1999b; Ryan, 1995). For us, however, autonomy concerns the experience of integration and freedom. (Deci & Ryan, 2000, p. 231)

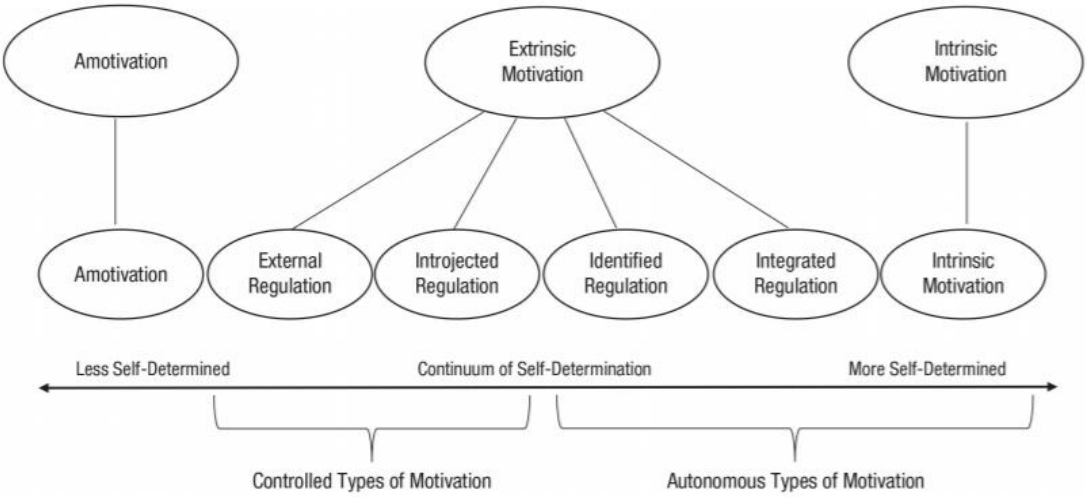
In other words, competence, relatedness, and autonomy can be viewed as basic psychological needs that every person seeks to achieve and find fulfillment in. These three needs have become a popular topic which relate to other research findings as well. The role parents play in influencing their student by increasing their psychological needs from being involved with college planning, being positive examples, setting high academic standards early on, and supporting their career volition (Mitchall & Jaeger, 2018) helps show that the fulfillment of psychological needs start early with the influence from parents or guardians. The psychological needs are becoming a related topic in minority research as well and for a Latino/a review please see Trevino and DeFreitas (2014). Other related topics include ethnic and gender differences investigating different goal orientations, self-efficacy, motivation, or academic performance (D'Lima et al., 2014). Need fulfillment is a beginning point that extends out to other important and interesting topics including self-regulation, engagement, and academic achievement.

Self-regulation is internalizing a set of values that shape behavior and as behaviors become more automatic the values internalized become closer to the actual self (Ryan & Connell, 1989). Although the amount of internalization that has occurred for a given value falls along a continuum from no motivation to fully intrinsically motivated, six types of behavioral regulation have been proposed to help conceptualize differences along the continuum. The six regulatory types are amotivation, external regulation, introjected regulation, identified regulation, integrated regulation, and intrinsic motivation (Deci & Ryan, 2000; Howard et al., 2021; Ryan &

Connell, 1989). As seen in Figure 2 from Howard et al. (2021), a continuum can be used for illustration to display where each of these regulatory types fall along the theoretical continuum between not being motivated at all and being purely intrinsically motivated.

Figure 2

Continuum of Motivation as Understood in Self-Determination Theory



Note. Continuum of motivation from self-determination theory. By J. L. Howard, J. Bureau, F. Guay, J. X. Y. Chong, and R. M. Ryan, from Perspectives on Psychological Science (Volume 16, Issue 6) p. 1301, copyright © 2021 by SAGE Publications. Reprinted by Permission of SAGE Publications.

Academic Engagement

The fulfillment of these three psychological needs have demonstrated strong connections to high quality behavioral and emotional engagement in school. Deci and Ryan (2000) express that when need fulfillment is reached and one becomes closer to being intrinsically motivated

then they will be fully engaged with the activity present. This idea can be more easily understood that as people start fulfilling more of their psychological needs they slowly become more and more engaged with what they are focusing on (Skinner et al., 2009). This relationship between need satisfaction and engagement also seems to be so important that it takes priority over one's personality traits when using the five factor personality model showing that engagement was more reliant on satisfying one's needs over their inherit personality characteristics (Sulea et al., 2015). Engagement upon satisfying psychological needs also expands to not only the activity present, but to a greater context. Students in an academic context who fulfill their psychological needs and engage with the material or activity are shown to grow deeper into their commitments to the academic institution and are committed to completing their degree (Davidson & Beck, 2019). This makes it even more important for students to focus on need fulfillment as there is a positive association with satisfying it and becoming more intrinsically motivated to become more engaged and committed to one's goals. This is especially important for FGCS who are more at risk of dropping out (Antonelli et al., 2020; Azmitia et al., 2018; D'Lima et al., 2014; Redford et al., 2017; Stephens et al., 2012, 2014; Trevino & DeFreitas, 2014) and may be more stressed than their CGCS counterpart. One explanation why need fulfillment has a connection with positive academic outcomes is that it makes individuals more resilient when coping with the many stressors commonly experienced in college life (Close & Solberg, 2008).

College Stressors

The transition from high school to college is a naturally stressful time for all students. FGCS may feel more isolated in this process however since they have no familial support to help guide them as their parents never attended college previously leaving a new and stressful experience for both student and family supports (Feldt, 2008; Torres & Solberg, 2001). Having

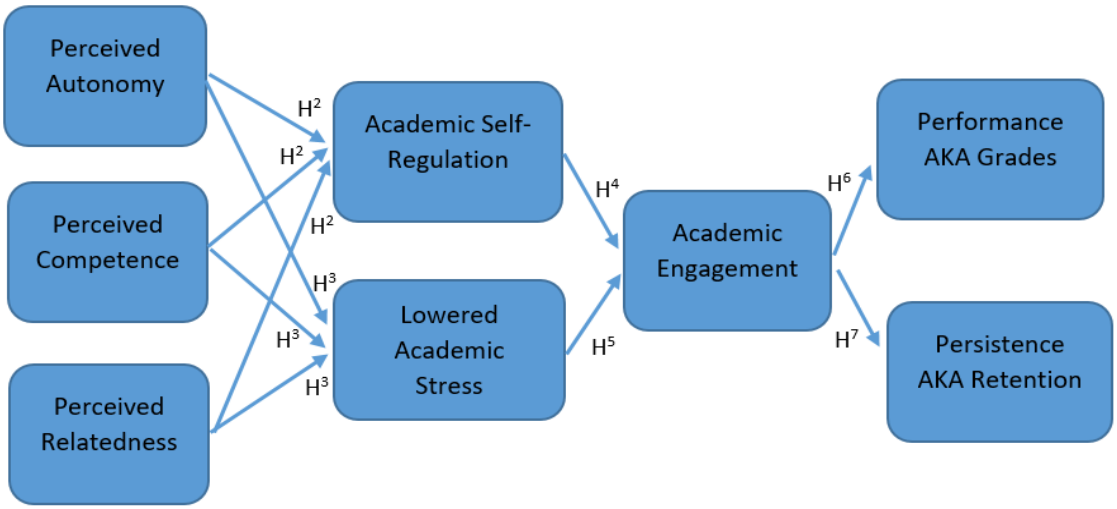
that familial guidance built-in helps students become confident adapters in life transitions and can help ease the anxiety that one would naturally feel from experiencing these life events for the first time (Torres & Solberg, 2001).

Stressors can be reduced not only with family support and resources, but also with support from the academic faculty (professors, advisors, student support services, etc.). Students who feel more connected with faculty show higher autonomous motivation to attend school and report as being more self-efficacious (Close & Solberg, 2008). This understanding is important for educators and administration to understand when working with students or hiring new faculty, respectively. Stressors are not always academic in nature, but could be relationship-specific, family related, financial, housing related, matters of self-doubt, etc. which means college stress should be viewed as more holistic rather than purely academic (Feldt, 2008). Educators who are working with students are thus recommended to understand students on a deeper level rather than a name in the gradebook.

The overall framework of this study is to investigate how stressors affect psychological need fulfillment between FGCS and CGCS. As need fulfillment increases, it is predicted that stress will decrease while also increasing internal academic self-regulation. This is predicted to increase academic engagement which will predict academic performance and retention. Figure 3 shows the theoretical framework that is being suggested.

Figure 3

Theoretical Framework of Study



Note. Theoretical framework predicted for this study with arrows representing an effect on the next stage of the model.

In investigating this study my hypotheses are many. I hypothesize:

1. On average, FGCS in their first semester will have higher levels of stress compared to first semester CGCS.
2. Increased psychological need fulfillment will result in increased academic self-regulation.
3. Increased psychological need fulfillment will result in decreased stress.
4. Increased academic self-regulation will result in increased academic engagement.
5. Decreased stress will result in increased academic engagement.
6. Increased academic engagement will account for a significant amount of the variance in academic performance.
7. Increased academic engagement will account for a significant amount of the variance in student retention.

METHODS

Participants

The population under investigation was undergraduate NMU students from the PSY100 (Introduction to Psychology) course. A total sample of *n* = 320 students signed up for part one of the study which took place near the start of the semester (Time 1). After accounting for missing data, incomplete survey completion, and duplicates, *n* = 273 participants were invited for part two of the survey that took place towards the end of the semester (Time 2). After performing the same checks on the end of semester data (i.e. missing data, etc.), the sample dropped to *n* = 249 participants. Finally, after applying the inclusion criteria of participants (18 years of age or older and being within their first semester at NMU) the final sample for the study consisted of *N* = 203 participants. One extra credit point was an incentive given to students at the end of the semester for those who completed the entire study, including to those who did not meet the inclusion criteria but filled out the surveys.

The majority of the sample *n* = 150 (73.9%) identified as women. Other gender demographics showed *n* = 40 (19.7%) identifying as men, *n* = 7 (3.4%) identifying as nonbinary, *n* = 2 (1.0%) identifying as transgender, *n* = 2 (1.0%) identifying as a gender not listed, and *n* = 2 (1.0%) preferring not to answer. The age ranged from 18-22, with the majority of the sample *n* = 176 (86.2%) being of the age of 18. Common with the demographics of the location where the study was conducted, the majority of the sample *n* = 181 (89.1%) identified as white. Other race demographics showed *n* = 8 (3.9%) identifying as Hispanic, *n* = 4 (2.0%) identifying as other, *n* = 3 (1.5%) identifying as black, *n* = 3 (1.5%) identifying as Native American/Pacific Islander, *n* = 2 (1.0%) identifying as Asian, and *n* = 2 (1.0%) preferring not to answer. As an important

detail with this study, the identification of first-generation and continuing-generation college students was critical. The majority of the sample n = 148 (72.9%) identified as a continuing-generation college student with n = 55 (27.1%) students identifying as a first-generation college student.

Using an *a priori* independent samples *t*-test power analysis (G*Power 3.1.9.7) with a medium effect (f = .15), alpha at α = .05, and power of β = .80 had the original participant total calculated to be 34. Although, following a multiple regression of medium effect (f = .15), alpha at α = .05, power of β = .80, and with four predictors in a two-tailed test, the minimum desired sample size is calculated to be 86 participants. In other words, my sample size will be sufficient in data analyses and should allow for proper statistical testing of all stated hypotheses.

Measures

College Student Stress Scale

The scale developed by Feldt (2008) originally set out to measure first year college students on their transition and adjustment to college life. The scale covers small, yet broad topics typical for first year college students to encounter and asks them to indicate how often they are distressed, anxious, or question their ability in relation to the topic.

This scale (α = .87; Feldt, 2008) contains 11 Likert-based questions with 1 indicating "Never" and 5 indicating "Very often." The scale range is from 11.00-55.00. A sample item from this scale is, "How frequently did you feel as though you were no longer in control of your life?" Scoring is done by adding together each question to receive the College Student Stress Scale total. This scale is available to the public to be used in research.

Basic Needs Satisfaction Scale

The original scale developed by Deci and Ryan (2000) was designed to measure basic psychological needs consisting of autonomy, competence, and relatedness.

A variant of this scale was further developed to measure basic psychological needs within the work context. The name was similarly called the Basic Needs Satisfaction at Work Scale (Deci et al., 2001), but for my purposes it will be modified to make it pertain to NMU. "Work" or "job" keywords will be changed to NMU to better allow a participant to reflect on their time at NMU and how it relates to their psychological needs. A sample item from this scale in its original format is, "I do not feel very competent when I am at work." The adapted question for my scale is, "I do not feel very competent when I am at NMU."

This scale ($\alpha = .89$; Deci et al., 2001) contains 21 Likert-based questions across three subscales (autonomy, competence, and relatedness) with 1 indicating "Not at all true" and 7 indicating "Very true." A sample item from the subscale for autonomy is, "I feel like I can make a lot of inputs to deciding how my studying gets done." A sample item from the subscale for competence is, "People at NMU tell me I am good at what I do." A sample item from the subscale for relatedness is, "I really like the people at NMU." Scoring is done by averaging the total score for each subscale, respectively. The scale range is from 1.00 – 7.00. Items that are reverse scored should first have the original number (answer) subtracted from 8 to then equal the real number that will be used to calculate the average. This scale is available to the public to be used in research.

Academic Self-Regulation Questionnaire

Developed by Connell and Ryan (1984), this questionnaire looks at a participant's internalization process within an academic setting. The internalization process offers different types of regulation to explain an individual's perceived locus of causality: external regulation, introjected regulation, identified regulation, and intrinsic motivation. Perceived locus of causality is broadly defined to be either internal or external with the former being "the actor is perceived as an 'origin' of his or her behavior," and the latter being "the actor is seen as a 'pawn' to heteronomous forces" (Ryan & Connell, 1989, p. 749).

This questionnaire (α = .62 – .82; Ryan & Connell, 1989) contains 16 Likert-based questions across four subscales (external regulation, introjected regulation, identified regulation, and intrinsic motivation) with two sections (8 questions each) asking "Why do I do my homework" and "Why do I try to do well in college" with 1 indicating "Not at all true" and 4 indicating "Very true." A sample item from the subscale for external regulation from the first section is, "Because I'll get in trouble if I don't." A sample item from the subscale for introjected regulation from the first section is, "Because I want the teacher to think I'm a good student." A sample item from the subscale for identified regulation from the first sections is, "Because I want to understand the subject." A sample item from the subscale of intrinsic motivation from the first section is, "Because it's fun." Scoring is done by averaging the total score for each subscale, respectively. This will create a final score for each subscale. The scale range is from 1.00 – 4.00. Next, to calculate the Relative Autonomy Index (RAI) which is a combined total of all subscales I will use the formula: 2(Intrinsic) + Identified - Introjected - 2(External). The RAI range is from -9.00 – 9.00. This scale is available to the public to be used in research.

Engagement vs Disaffection with Learning Scale

Developed by Skinner et al. (2009), this scale looks at whether an individual is engaged with learning both within a behavioral and emotional context (i.e. behavioral engagement, emotional engagement) or its conceptual opposite – disaffection (i.e. behavioral disaffection, emotional disaffection) (Connell & Wellborn, 1991). Engagement is broadly defined as "the quality of a student's connection or involvement with the endeavor of schooling and hence with the people, activities, goals, values, and place that compose it" (Skinner et al., 2009, p. 494). Disaffection meaning "the absence of engagement, including the absence of effort or persistence" (Skinner et al., 2009, p. 495).

This scale (α = .88 – .92; Skinner et al., 2009) contains 20 Likert-based questions across four subscales (behavioral engagement, behavioral disaffection, emotional engagement, and emotional disaffection) with 1 indicating "Not at all true" and 4 indicating "Very true." A sample item from the subscale for behavioral engagement is, "I try hard to do well in college." A sample item from the subscale for behavioral disaffection is, "In class, I do just enough to get by." A sample item from the subscale for emotional engagement is, "I enjoy learning new things in class." A sample item from the subscale for emotional disaffection is, "When I'm in class, I feel bad." Scoring is done by averaging the total score for each subscale, respectively. Items that are reverse scored will first have the original number (answer) subtracted from 5 to then equal the real number that will be used to calculate the average. To further emphasize this, when reverse coding for the disaffection portion of the subscales (behavioral and emotional), a smaller subscale total indicates a larger disaffection. This means when conducting analyses, a lower disaffection score indicates an increase in disaffection. The subscale ranges are from 1.00 – 4.00. To calculate the overall learning involvement (engagement and disaffection) of an individual,

sum all of the averaged subscale scores together. The learning involvement range is from 4.00 – 16.00. This scale is available to the public to be used in research.

Performance and Retention Measures

The final part of the study was to assess the participants' final overall grade point average for the semester (performance) and to see if the participants are registered for the upcoming Winter 2022 semester to investigate retention. Students at the beginning of the study signed the informed consent to provide me with this permission.

Procedure

At the start of the Fall 2021 semester (Time 1), NMU students were invited to participate in the study through their PSY100 course, for extra credit at the end of the semester. The PSY100 students all received an email inviting them to the study after the PSY100 professor informed the class that they would be receiving an email invitation with a Qualtrics survey to participate in a master thesis study. If they agreed to participate in the study then they would receive one extra credit point at the end of the semester. Informed consent was the first page of the Qualtrics survey describing the purpose of the study. Participants were free to exit the study if they did not consent after reading the informed consent form and were also free to exit the study whenever they chose to. The Qualtrics link to access the study was active for ten days to account for student stability during the start of the semester (adding or transferring into class). Data from the Qualtrics survey closed after the tenth day and the data was compiled.

Students who did complete the survey were then emailed again and asked to complete the survey a second time at the end of the semester (Time 2). The purpose of this was to track changes over time and to see if students' self-regulation, stress, engagement, and psychological

well-being changed over the course of the semester. The Qualtrics survey was active for the last week of classes before closing. Reminders were given every two days (both at the beginning and end of the semester) to help with participant study retention. Finally, data on participants' performance (cumulative GPA) and their status of enrollment in the Winter 2022 semester (retention) were collected from the university database with assistance from the university's institutional research office.

Data Analysis

An independent *t*-test was conducted between FGCS and CGCS to compare the average stress between the two groups at the beginning of the semester. A series of multiple regression analyses were conducted to predict each outcome (stress, academic self-regulation, academic engagement, and performance). Beginning of semester psychological need fulfillment (autonomy, competence, and relatedness) were used to predict stress and academic self-regulation at Time 1. Time 1 stress and academic self-regulation will be used to predict total semester academic engagement (Time 1 + Time 2). A linear regression was also conducted using semesterly academic engagement to predict performance. Finally, a binomial logistic regression analysis was conducted using semester academic engagement to predict retention. All analyses were conducted using IBM *Statistical Package for the Social Sciences* (ver. 28.0.0.0; SPSS).

RESULTS

Measure Reliability

Each scale and subscale were checked for its scale reliability using SPSS at both the beginning and end of the semester when the participants took the measures. When calculating Cronbach's alpha coefficient for the subscale of autonomy, the resulting score ($\alpha = .58$) was much lower than the desired minimum target range of .65 – .80. Upon further investigation into the inter-item correlations of the subscale, item 11 (which is a reverse-score item) had very low correlation values with the other items (r = -0.02, .07, -0.03, -0.02, -0.07, .12) for Time 1. This being the only item with such a low correlation value, it was decided that this item would be excluded from analyses due to low inter-item correlation. All other scales and subscales calculated were shown to be adequate for reliability. Please refer to Table 1 for the Cronbach's alpha reliability coefficients at the beginning and at the end of the semester along with the means and standard deviations at each time point, for each measure, as separated by first-generation and continuing-generation student groupings. Note that the descriptive statistics for the autonomy subscale in Table 1 are from after the poorly performing item had been removed.

Table 1

Cronbach's Alpha, Mean, and Standard Deviation Scores for Each Measure Between Groups

	Time 1					Time 2				
		FGCS		CGCS			FGCS		CGCS	
Measure	α	*M*	*SD*	*M*	*SD*	α	*M*	*SD*	*M*	*SD*
Autonomy	.64	5.19	0.75	5.05	0.82	.68	4.95	0.89	4.84	0.91
Competence	.67	4.91	0.72	4.97	0.85	.70	4.99	0.95	4.83	0.91
Relatedness	.81	5.03	0.95	5.23	0.85	.84	5.05	1.10	5.15	0.96
External Regulation	.65	3.07	0.62	2.93	0.57	.61	3.00	0.59	2.98	0.58
Introjected Regulation	.69	3.42	0.44	3.32	0.50	.71	3.36	0.47	3.32	0.51
Identified Regulation	.58	3.72	0.37	3.63	0.41	.66	3.57	0.44	3.55	0.49
Intrinsic Motivation	.78	2.67	0.70	2.38	0.66	.75	2.50	0.69	2.34	0.70
Behavioral Engagement	.62	3.36	0.38	3.37	0.40	.71	3.13	0.50	3.14	0.46
Behavioral Disaffection	.70	2.79	0.47	2.75	0.49	.70	2.59	0.56	2.60	0.50
Emotional Engagement	.73	3.17	0.45	3.07	0.41	.74	3.03	0.50	2.96	0.47
Emotional Disaffection	.74	2.83	0.54	2.81	0.55	.78	2.60	0.66	2.78	0.58
College Student Stress	.87	37.36	7.71	34.53	8.30	.88	38.40	7.43	35.25	8.85

Note. Range for Autonomy, Competence, and Relatedness is from 1.00 – 7.00. Range for College Student Stress is from 11.00 – 55.00. Range for all other measures is from 1.00 – 4.00.

Differences Between First-Generation and Continuing-Generation Groups

An independent samples *t*-test was used to investigate the first hypothesis that first-generation college students (FGCS) would report higher levels of stress when compared to

continuing-generation college students (CGCS). Specifically, when 55 FGCS in Time 1 (M = 37.36, SD = 7.71) were compared to 148 CGCS in Time 1 (M =34.53, SD = 8.30), FGCS reported higher college stress scores, $t(201) = 2.20$, $p = .029$, $d = 0.35$, 95% CI [0.04, 0.66]. This difference was consistent with Time 2 as well showing FGCS (M = 38.40, SD = 7.43) compared to CGCS (M =35.25, SD = 8.49) reported higher college student stress scores, $t(201) = 2.35$, p = .020, $d = 0.37$, 95% CI [0.06, 0.68]. These data support the first hypothesis that FGCS would, on average, report higher levels of stress compared to CGCS.

Significant differences between FGCS and CGCS were also found for intrinsic motivation, emotional disaffection, learning involvement, and academic performance (i.e. GPA). Interestingly, there was a difference in Time 1 with intrinsic motivation showing FGCS (M = 2.67, SD = 0.70) compared to CGCS (M =2.38, SD = 0.66) reported higher intrinsic motivation scores, $t(201) = 2.75$, $p = .007$, $d = 0.43$, 95% CI [0.12, 0.75]. However, this significant difference did not last into Time 2. At the end of the semester (Time 2), there was a marginal significance with emotional disaffection showing FGCS (M = 2.60, SD = 0.66) compared to CGCS (M =2.78, SD = 0.58) reported more emotional disaffection, $t(201) = -1.86$, $p = .064$, d = -0.29, 95% CI [-0.61, 0.02]. This difference was enough to make an emotional disaffection change score (Time 2 minus Time 1) significant showing FGCS (M = -0.23, SD = 0.67) compared to CGCS (M = -0.03, SD = 0.45) reported greater increase in emotional disaffection over the semester, $t(201) = -2.36$, $p = .019$, $d = -0.37$, 95% CI [-0.68, -0.06]. Lastly, there were significant differences shown in GPA, $t(201) = -3.57$, $p < .001$, $d = -0.56$, 95% CI [-0.88, -0.25], with FGCS (M = 2.84, SD = 0.84) performing worse than CGCS (M = 3.29, SD = 0.79). Table 2 details the independent samples t-test scores, significance values, and Cohen's d effect sizes for Time 1, Time 2, and change scores for the measures that were seen to be significantly different

between student groups. Table 3 details the independent samples *t*-test means and standard deviations for each measure between student groups across Time 1, Time 2, and also the change scores along with *p* value significance to help visualize the significant student group differences.

Table 2

Comparisons of Averages at the Beginning of the Semester, End of the Semester, as well as the Change Scores

	Time 1			Time 2			Time 2 – Time 1		
Measure	*t*(201)	*p*	*d*	*t*(201)	*p*	*d*	*t*(201)	*p*	*d*
College Student Stress	2.20	.029*	0.35	2.35	.020*	0.37	0.38	.701	0.06
Intrinsic Motivation	2.75	.007**	0.43	1.42	.158	0.22	-1.46	.146	-0.23
Emotional Disaffection	0.17	.865	0.03	-1.86	.064[a]	-0.37	-2.36	.019*	-0.37
Academic Performance				-3.57	< .001 ***	-0.56			

Note. Comparisons are between 55 FGCS and 148 CGCS. *t*(201) indicates the degrees of freedom associated with the *t*-test. *p* indicates the significant value. Cohen's *d* indicates the level of effect present; 0.2 = small, 0.5 = medium, 0.8 = large. * indicates $p < .05$. ** indicates $p < .01$. *** indicates $p \leq .001$. Superscript "a" indicates *p* = marginal significance (.06 – 1.0).

Table 3

Independent Samples t-Test Means and Standard Deviations at the Beginning of the Semester, End of the Semester, as well as the Change Scores

		Time 1		Time 2		Time 2 – Time 1	
	Measure	*M*	*SD*	*M*	*SD*	*M*	*SD*
FGCS							
	College Student Stress	37.36*	7.71*	38.40*	7.43*	1.04	5.12
	Intrinsic Motivation	2.67**	0.70**	2.50	0.69	-0.18	0.58
	Emotional Disaffection	2.83	0.54	2.60[a]	0.66[a]	-0.23*	0.67*
	Academic Performance			2.84***	0.84***		
CGCS							
	College Student Stress	34.53*	8.30*	35.25*	8.49*	0.71	5.33
	Intrinsic Motivation	2.38**	0.66**	2.34	0.70	-0.04	0.57
	Emotional Disaffection	2.81	0.55	2.78[a]	0.58[a]	-0.03*	0.45*
	Academic Performance			3.29***	0.79***		

Note. Comparisons are between 55 FGCS and 148 CGCS. * indicates $p < .05$. ** indicates $p < .01$. *** indicates $p \leq .001$. Superscript "a" indicates p = marginal significance (.06 – 1.0).

Psychological Need Fulfillment, Academic Self-Regulation, Stress, Sum Academic Engagement, and Academic Performance Relationship Testing for the Model

Multiple regressions were performed to investigate hypotheses two through six. The next step was to test the second hypothesis, which predicted that Time 1 psychological need fulfillment (i.e. autonomy, competence, and relatedness) is correlated with Time 1 academic self-

regulation (i.e. relative autonomy index). The positive Pearson correlation values are most seen when autonomy, competence, and relatedness are correlated with the relative autonomy index (RAI) since the RAI is a combined formula of all of the self-regulatory motivation orientations. Competence ($r = .44$, $p < .001$) has the largest correlation on this part of the model with autonomy ($r = .32$, $p < .001$) following. Relatedness ($r = .13$, $p = .060$) is only marginally significant in this part of the model, but did show higher significance when only looking at the more autonomous self-regulation orientations, identified regulation ($r = .15$, $p = .028$) and intrinsic motivation ($r = .18$, $p = .013$).

When regressing Time 1 autonomy, competence, and relatedness onto Time 1 relative autonomy index, $R^2 = .21$, $F(3, 199) = 18.07$, $p < .001$, all predictors were either significant or marginally significant. Both perceptions of competence $t(201) = 5.33$, $\beta = 0.43$, $p < .001$ and perceptions of relatedness $t(201) = -2.07$, $\beta = -0.16$, $p = .040$ were significant with perceptions of autonomy $t(201) = 1.73$, $\beta = 0.14$, $p = .086$ being marginally significant. These data support hypothesis two that increased psychological need fulfillment is associated with higher levels of academic self-regulation (i.e. RAI).

When looking at the same regression performed separately for first-generation college students (FGCS) and continuing-generation college students (CGCS), psychological need fulfillment on relative autonomy index with FGCS, $R^2 = .09$, $F(3, 51) = 1.68$, $p = .182$, shows that only perception of relatedness, $t(53) = -1.76$, $\beta = -0.30$, $p = .084$, is marginally significant in predicting higher levels of academic self-regulation. Using the same regression with CGCS, $R^2 = .28$, $F(3, 144) = 18.35$, $p < .001$, perception of competence, $t(146) = 5.02$, $\beta = 0.49$, $p < .001$, is significant in predicting higher levels of academic self-regulation.

Stress was negatively correlated with all psychological need fulfillment components with competence (r = -0.32, p < .001) being the largest correlation and autonomy (r = -0.28, p < .001) and relatedness (r = -0.21, p = .003) yielding smaller correlations. Table 4 shows the Pearson correlations for the first part of the model. When regressing Time 1 psychological need fulfillment onto Time 1 college student stress, R^2 = .12, F(3, 199) = 8.82, p < .001, only perceptions of competence was found to be significant t(201) = -2.71, β = -0.23, p = .007. This partially satisfies hypothesis three with competence being the most important psychological need to reduce feelings of stress. Table 4 that reports the Pearson correlations between autonomy, competence, and relatedness on stress does show negative relationships, but shared variance between the predictors accounted for similar variance in the stress variable, which resulted in the regression equation attributing that variance accounted for to the strongest predictor, competence, leaving the unique variance accounted for by the other predictors insignificant. When looking at the same regression between student groups, psychological need fulfillment on stress with FGCS, R^2 = .18, F(3, 51) = 3.74, p = .017, shows that perceptions of competence t(53) = -3.07, β = -0.45, p = .003 and autonomy t(53) = 2.22, β = 0.38, p = .031 are significant in predicting a reduction in stress. This was not fully the same for CGCS using the same regression, R^2 = .19, F(3, 144) = 11.37, p < .001, which showed that perceptions of autonomy t(146) = -3.56, β = -0.35, p < .001 was the significant predictor in reducing stress.

Table 4

Pearson Correlations (r) for Part One of the Model

#	Measure	1.	2.	3.	4.	5.
1.	Autonomy	–				
2.	Competence	.59***	–			
3.	Relatedness	.50***	.50***	–		
4.	Relative Autonomy Index	.32***	.44***	.13[a]	–	
5.	College Student Stress	-0.28***	-0.32***	-0.21**	-0.23***	–

Note. ** indicates $p \leq .01$. *** indicates $p \leq .001$. Superscript "a" indicates p = marginal significance (.06 – 1.0). r indicates the level of effect present; .1 = small, .3 = medium, .5 = large.

Table 5 examines correlations for the second part of the model building on the first part and looks at Time 1 academic self-regulation and stress with total semester (Time 1 + Time 2) academic engagement (i.e. sum learning involvement). The RAI is positively correlated (r = .49, p < .001) being significant with sum learning involvement. Lastly for this part of the model, stress (r = -0.26, p < .001) is negatively correlated with sum learning involvement.

Table 5

Pearson Correlations (r) for Part Two of the Model

#	Measure	1.	2.	3.
1.	Relative Autonomy Index	–		
2.	College Student Stress	-0.23***	–	
3.	Sum Learning Involvement	.49***	-0.26***	–

Note. *** indicates $p \leq .001$. r indicates the level of effect present; .1 = small, .3 = medium, .5 = large.

To test hypothesis four, I regressed Time 1 academic self-regulation (i.e. relative autonomy index) onto overall sum (Time 1 + Time 2) academic engagement (i.e. sum learning involvement) and a significant amount of the variance was accounted for (R^2 = .24), F(1, 201) = 63.59, p < .001. This was both significant for FGCS, t(53) = 3.30, β = 0.41, p = .002 accounting for (R^2 = .17) of the variance, and for CGCS, t(146) = 7.32, β = 0.52, p < .001 accounting for (R^2 = .27) of the variance. This shows that academic self-regulation at the start of the semester predicts engagement throughout the semester, which provides support for hypothesis four.

When regressing Time 1 college student stress onto overall sum academic engagement, a significant amount of the variance was accounted for (R^2 = .07), F(1, 201) = 14.85, p < .001. In other words, lower levels of stress at the start of the semester predicts higher levels of academic engagement throughout the semester, which supports hypothesis five. This relationship was not significant when considering only FGCS t(53) = -0.56, β = -0.08, p = .579, but was significant for CGCS t(146) = -4.22, β = -0.33, p < .001 accounting for (R^2 = .11) of the variance.

The third and final part of the model was to investigate correlations with sum learning involvement and academic performance (i.e. GPA) and student retention. A Pearson correlation between sum learning involvement and GPA shows a positive correlation (r = .35, p < .001) and is significant. When regressing overall sum academic engagement onto academic performance (i.e. GPA), a significant amount of the variance was accounted for (R^2 = .12), F(1, 201) = 27.93, p < .001. This was true for FGCS, t(53) = 2.36, β = 0.31, p = .022 accounting for (R^2 = .10) of the variance, and for CGCS, t(146) = 4.98, β = 0.38, p < .001 accounting for (R^2 = .15) of the variance. This demonstrates that greater academic engagement throughout the semester results in higher academic performance as measured by GPA for the semester, which supports hypothesis

six. Table 6 organizes results of the series of regression analyses used to test each part of the theoretical model.

Since retention is a binary variable, Spearman's rho was used to investigate the correlation between sum learning involvement and retention. Spearman's rho between these two variables resulted in close to no correlation ($\rho = .07$, $p = .319$) and was not significant. A binomial logistic regression was used to see if sum academic engagement is a significant predictor on whether or not a student registers for the following semester. Using the full model, sum academic engagement was a positive, but not significant (B = .14, *SE* = 0.11, $p = .215$) predictor of the probability of a student registering for the following semester. The odds ratio indicates that for every one unit increase on sum academic engagement, the odds of a student registering for the following semester increased by a factor of 1.15. This indicates that hypothesis seven is not supported by the data collected.

Table 6

Results of the Multiple Regression Analyses by Level of the Model

Regression Model	*t*	β	*p*	R^2	*F*	*df*	*p*
Time 1 Psychological Need Fulfillment Predicting Time 1 Academic Self-Regulation (H^2)							
Overall model				.21	18.07	3, 199	< .001
Autonomy	1.73	0.14	.086				
Competence	5.33	0.43	< .001				
Relatedness	-2.07	-0.16	.040				
Time 1 Psychological Need Fulfillment Predicting Time 1 College Student Stress (H^3)							
Overall model				.12	8.82	3, 199	< .001
Autonomy	-1.51	-0.13	.132				
Competence	-2.71	-0.23	.007				
Relatedness	-0.31	-0.03	.757				
Time 1 Academic Self-Regulation Predicting Sum Academic Engagement (H^4)							
Overall model				.24	63.59	1, 201	< .001
Relative Autonomy Index	7.97	0.49	< .001				
Time 1 College Student Stress Predicting Sum Academic Engagement (H^5)							
Overall model				.07	14.85	1, 201	< .001
College Student Stress	-3.85	-0.26	< .001				
Sum Academic Engagement Predicting Academic Performance (H^6)							
Overall Model				.12	27.93	1, 201	< .001
Sum Learning Involvement	5.29	0.35	< .001				

Note. Regression model indicates which predictors were used in the overall model. *t* indicates the score of the *t*-test from the predictor variables. β indicates the standardized beta score of the predictor variables. *p* indicates the predictor variable significance and the overall model significance. R^2 indicates the amount of variance that the model accounts for. *F* indicates the regression score in the overall model. *df* indicates the degrees of freedom used in the overall regression model.

DISCUSSION

The overall literature about first-generation college students (FGCS) states repeatedly that FGCS are less prepared than their continuing-generation college student (CGCS) peers within the academic sphere (Antonelli et al., 2020; Garriott et al., 2015; Terenzini et al., 1996). The present research is not new in that fact, but it is new in the fact that this research adds to the literature because it demonstrates the role of psychological need fulfillment in helping to explain self-regulation and stress related differences between these student groups and connects those factors to academic engagement to explain performance differences. This highlights the importance of psychological variables in understanding the FGCS experience.

Independent samples *t*-tests between FGCS and CGCS showed a significant difference in intrinsic motivation with FGCS reporting higher levels at the beginning of the semester. Sadly, this motivation was lost by the end of the semester showing no significant difference when compared with CGCS. This could be expected since intrinsic motivation is understood as having a desire to engage in an activity that is highly interesting and enjoyable with no concern of external consequence (Deci & Ryan, 2000). There are many aspects of college that are not inherently enjoyable, desirable, or interesting to the majority of students, teachers, and administrators (Connell & Ryan, 1984). FGCS reported significantly higher levels of intrinsic motivation at the beginning of the semester, but as the semester continues on within the educational workplace, the "job" of the student loses its luster and the once exciting intrinsically motivating activity (college) stabilizes to more common external motivations (Connell & Ryan, 1984).

Other independent samples *t*-tests involving emotional disaffection need to be discussed. Emotional disaffection was marginally significant between groups ($p = 064$) with FGCS reporting higher levels of emotional disaffection. When looking at the emotional disaffection change score (Time 2 – Time 1), this change is a significant difference ($p = 019$) when compared to how CGCS reported. This may be because FGCS may not feel as comfortable in the classroom setting which could affect how they engage with the academic content. Connell and Wellborn (1991) propose that autonomous academic self-regulation (i.e. relative autonomy index) and emotional security both with the teacher and classmates will affect a students' engagement. This provides an explanation for perceptions of autonomy and relatedness and indicates that students need to feel comfortable within the setting of the classroom to then be able to more adequately focus and engage with the material.

When running multiple regression to test for other hypotheses, hypothesis one was supported in that FGCS are significantly more stressed than their CGCS peers. The data shows that this stress continues to stay high (and actually increases) by the end of the semester. Both at the beginning and end of the semester, FGCS reported significantly higher levels of overall stress. Some possible reasons that could explain this can be answered by reviewing the content of the questions asked by the College Student Stress Scale (CSSS; Feldt, 2008). The CSSS asks questions in domains where it would be common for incoming college freshman students to possibly feel negative emotions (anxious or distressed). These domains involve finances (financial and housing), perceptions of relatedness (personal and family), perceptions of competence (academic and ability to handle difficulties in life), and perceptions of autonomy (being away from home, ability to attain goals and be in control of one's life, and ability to stay calm when events don't go as planned). Research on FGCS tells us that this population often

struggles with socioeconomic challenges (Antonelli et al., 2020, Garriott et al., 2015; Garriott & Nisle, 2018; Redford et al., 2017) and questions involving how to pay for college or how to pay for rent while attending college quickly becomes a great stressor in one's life. Perceptions of competence involving academic performance is one of the most researched challenges for FGCS (Garriott et al., 2015; Garriott & Nisle, 2018; Stephens et al., 2012, 2014; Terenzini et al., 1996). FGCS not having the same cultural capital of CGCS often can lead to difficulty in excelling in the academic context because this ends up being a cultural mismatch for them (Garriott & Nisle, 2018; Stephens et al., 2012). This can affect how FGCS perceive difficulties since FGCS are more competent in handling interdependent challenges which is different from the new independent challenges offered from college which can be more novel and salient to them (Stephens et al., 2012, 2014). How FGCS view college is also different from a cultural perspective and is often foreign to family and friends leaving FGCS alone to fend for themselves in navigating the new academic environment possibly reducing perceptions of relatedness (Azmitia et al., 2018; Stephens et al., 2012; Terenzini et al., 1996).

This is supported in the present research showing that Time 1 perceptions of psychological need fulfillment have a positive effect on Time 1 academic self-regulation (i.e. relative autonomy index) in the full model with perceptions of relatedness being more important for FGCS than it was for CGCS. While this supports hypothesis two, it further shows that FGCS need to be supported with psychological need fulfillment in mind, specifically with resources or faculty that encourage a sense of belongingness (Azmitia et al., 2018; Antonelli et al., 2020; Garriott et al., 2015; Garriott & Nisle, 2018; Hilts et al., 2018; Stephens et al., 2012, 2014). CGCS reported that perceptions of competence were more likely to predict their academic self-regulation. This could possibly be because of their upbringing and background prior to college

since literature shows that degree-holding parents have higher academic expectations for their children and these children typically earn higher scores in academic performance via GPA (Antonelli et al., 2020; Mitchall & Jaeger, 2018).

In analyzing if beginning of the semester psychological need fulfillment reduces beginning of the semester stress, only competence was shown to significantly reduce levels of stress across the full model. At first glance, it seems that hypothesis three is partially supported since autonomy nor relatedness was found to be significant in the full model. It is important to remember that competence, autonomy, and relatedness are highly correlated (competence – autonomy, $r = .59$, $p < .001$, competence – relatedness, $r = .50$, $p < .001$). This may mean that autonomy and relatedness could instead be mediated by competence and still be important in reducing stress. FGCS were shown to report that perceptions of competence and autonomy were important for them to then predict reduced stress. FGCS struggle academically a lot more than CGCS (Garriott & Nisle, 2018; Stephens et al., 2012; Terenzini et al., 1996) so this would make sense that when perceptions of competence are increased there would be a significant reduction in stress. This is the same for perceptions of autonomy as a large portion of FGCS feel forced or thrown into the new academic context as the need for higher education is pushed for career placement (Azmitia et al., 2018; Stephens et al., 2012). This need for autonomy can fortunately increase and develop as FGCS continue through college and begin to gain more self-efficacy and confidence within the academic context (Garriott et al., 2015; Garriott & Nisle, 2018; Mitchall & Jaeger, 2018). CGCS reported that perceptions of autonomy were most important for them to reduce feelings of stress and this may be because a level of academic competence has been expected throughout their development. This can lead CGCS to desire having autonomy in one's

decisions and choices and receiving autonomy-supportive behaviors is more important in providing what CGCS need (Mitchall & Jaeger, 2018).

The next portion of the model was significant in supporting hypothesis four with the beginning of the semester academic self-regulation predicting sum academic engagement (i.e. sum learning involvement). This was true for both FGCS and CGCS and is supported by previous literature (Antonelli et al., 2020; Hilts et al., 2018; Stephens et al., 2012). As students become more autonomous in their self-regulation, it allows them the capacity to clearly be engaged and focused when in the classroom, both in a behavioral and emotional aspect (Skinner et al., 2009).

The expectation for stress to affect sum academic engagement was shown with the reduction of stress helping to predict higher levels of sum academic engagement. This was significant in the full model thus supporting hypothesis five, but interestingly, when examining between FGCS and CGCS separately, only CGCS showed stress as a significant predictor. Similarly, to Garriott and Nisle (2018), stress was not a significant predictor to academic goal progress (also known as environmental mastery) for FGCS, but was for CGCS. Garriott and Nisle (2018) identified that there was an indirect effect with reflective coping skills (i.e. approach challenges, rather than avoiding, by using past experiences to better solve them) that FGCS do to link how stress is connected with academic goal progress; FGCS encounter a stressful situation first on appraisal and then partake in self-regulatory reflective coping mechanisms to then help with their academic goal progress. This may be the same situation happening here on why stress was not a significant predictor on sum academic engagement for FGCS.

When using sum academic engagement as a predictor for academic performance (GPA), the full model was shown to be significant and was significant across FGCS and CGCS supporting hypothesis six. This terminus of the model involves the previous parts all working together as predicted. Since GPA is grown from the beginning of the semester, all parts of the model are important to then see student GPA outcomes. Psychological need fulfillment helps to increase academic self-regulation (Antonelli et al., 2020; Garriott & Nisle, 2018; Hilts et al., 2018) and to decrease stress (Hilts et al., 2018; Mitchall & Jaeger, 2018; Terenzini et al., 1996). Academic self-regulation and stress in turn helps to increase sum academic engagement (Antonelli et al., 2020; Garriott & Nisle, 2018; Skinner et al., 2009) which is used to predict higher levels of academic performance (Stephens et al., 2012; Wibrowski et al., 2017).

When looking at group differences between FGCS and CGCS, GPA was significantly different with CGCS yielding the higher GPA average. This unfortunately is not surprising and is supported by the majority of literature where it clearly states that FGCS are more likely to suffer from poorer academic performance when compared to their CGCS peers (Garriott et al., 2015; Garriott & Nisle, 2018; Stephens et al., 2012, 2014; Terenzini et al., 1996). Some intervention studies have shown to help increase GPA in FGCS; Stephens and colleagues (2014) had FGCS attend a "difference-education" panel where they were taught about how differences in someone's background can help to be a benefit in college. This was taught by a panel of other FGCS and CGCS upperclassmen to reinforce that being from a different background isn't a weakness, but can be a strength. The panelists made sure to connect their background to how it has helped them in the academic context. FGCS who attended this panel were able to increase their GPA compared to other students who attended a standard panel which was similar, but was more general in context (Stephens et al., 2014). Another intervention done by Wibrowski and

colleagues (2017) had underrepresented students (mostly FGCS) attend a summer-skills learning support program (SLSP) before the first semester of college. The students within the SLSP received direct program assistance with financial aid, academic counseling, and academic enrichment opportunities, along with an academic counselor assigned to them and who would stay with them until they reached 30 college credit hours. Each SLSP student met the faculty and administrators and attended a two-day orientation. After the orientation, the SLSP students attended seminars covering preparatory coursework in English, biology or geology, math, speech, and an academic success course. The academic success course covered topics like self-perception, relationships (personal and academic), study skills, understanding financial aid, and well-being issues. The overall goal of the program was to help SLSP students develop more autonomous academic self-regulation and to help form positive beliefs as they pertain to self-motivation. Students who went through this extensive six-week summer program showed an increase in GPA, intrinsic motivation, task value, self-efficacy, metacognition, time management, and resource seeking skills (Wibrowski et al., 2017).

The seventh and final hypothesis was to examine if sum academic engagement would be a significant predictor on whether or not a student would register for the following semester and be "retained." This was the only hypothesis that was not supported at all leaving plenty of room to question the reasons involved why students continue to persist through college. Hilts and colleagues (2018) report that underrepresented groups (i.e. FGCS, women, ethnic minorities) within the science, technology, energy, and mathematics (STEM) fields benefit greatly from higher levels of perceived competence, and more importantly, higher levels of perceived relatedness. Having relational, peer support within the STEM fields help students stay retained

because it provides emotional support and once these students start to begin feeling competent then this helps to synergize with their need for relatedness (Hilts et al., 2018).

Limitations

This study has many limitations that must be discussed. Firstly, the demographic sample primarily being people who identified as women (73.9%) and who were predominately white (89.2%). This is hard to generalize the results across demographics alone and should be investigated in a more diverse population. Secondly, using two time points is not enough to adequately track population differences and more time points should be involved to be able to better track the progression of psychological need fulfillment, stress, academic self-regulation, and academic engagement. Using time points at the start of the semester and at the end of semester leaves a lot lost in translation between the two points.

Future Directions

Certain directions can be taken to further investigate the finer details involved in understanding the first-generation college student (FGCS) experience. Investigation of paired samples *t*-tests changes over time within student groups should be investigated through hypotheses. Significant changes that were noticed using between groups independent samples *t*-tests at one time point and not at the other time point brings in further questions with the respective variable. This being the case, answers could possibly be found if paired samples *t*-tests were performed for further investigation. Appendix D shows certain paired samples *t*-tests that were performed for exploratory analyses, but should be done again using specific hypotheses as a focus and direction. Also, in an attempt to support hypothesis seven (sum academic engagement predicting retention) a wider approach should be done to explain why students stay

and register for the following semester. This could possibly be explained with more variables entering the multiple regression model (e.g. GPA, affect towards college, financial stability, interpersonal relational stability, and number of personal crises). Furthermore, investigation into academic engagement should be conducted as to why students decrease in overall learning involvement as the semester nears its end. Hypotheses investigating whether or not this is because psychological need fulfillment is reduced or possibly from academic fatigue need to be further investigated to help elucidate this issue.

CONCLUSION

First-generation college students (FGCS) struggle to find their place in higher education, but support is available and there is room for everyone. The present research clearly shows that FGCS are more stressed than their continuing-generation college student (CGCS) peers, but through psychological need fulfillment (i.e. autonomy, competence, relatedness) this stress can be reduced. Furthermore, psychological need fulfillment helps to increase academic self-regulation leading students towards more autonomous styles of motivation (i.e. identified, integrated, intrinsic motivation). When these autonomous motivation orientations are synergized with reduced stress, an increase in academic engagement is possible helping to improve academic performance (i.e. GPA). More needs to be done to investigate retention, but this is an ongoing question that will lead us to further investigate FGCS and to find new ways to help this academic minority that needs faculty and administrative support.

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APPENDIX A

IRB APPROVAL LETTER

NORTHERN MICHIGAN UNIVERSITY

Jon Barch <jbarch@nmu.edu>

HS-21-9 - Initial: Expedited Review Approval Letter
1 message

do-not-reply@cayuse.com <do-not-reply@cayuse.com> Tue, May 11, 2021 at 3:11 PM
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Cc: dereande@nmu.edu, leckert@nmu.edu, jantaylo@nmu.edu

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To:
Jon Barch
Psychological Sciences

From:
The Northern Michigan University Human Subjects Review Board

Dr. Lisa Schade Eckert, Dean of Graduate Studies and Research
NMU Institutional Official

Re:
Initial - HS-21-9 Differences Between First-Generation and Continuing-Generation College Students in Psychological Need Fulfillment, Academic Engagement, and Retention
IRB Study Number: HS-21-9

The Northern Michigan University Human Subjects Review Board has approved your study, Differences Between First-Generation and Continuing-Generation College Students in Psychological Need Fulfillment, Academic Engagement, and Retention.

Include your study number, HS-21-9, on all research materials and any correspondence regarding this project.

If any unanticipated problems arise involving human subjects, such as a subject suffers an injury during research or if there is an incident of non-compliance with IRB policies and procedures, you must take immediate action to assist the subject and notify the IRB chair (dereande@nmu.edu) and NMU's IRB Institutional Official (leckert@nmu.edu) within 48 hours. Additionally, you must complete an Incident Form in Cayuse IRB.

Please remember that informed consent is a process beginning with a description of the project and insurance of participant understanding. Informed consent must continue throughout the project via a dialogue between the researcher and the research participant.

If you find that modifications of investigators, methods, or procedures are necessary, you must submit a modification submission through Cayuse IRB. Any changes or revisions to your approved research plan must be approved by the IRB prior to implementation.
Until further guidance, per CDC guidelines, the PI is responsible for obtaining signatures on the COVID-19 Researcher Agreement and Release and COVID-19 Research Participant Agreement and Release forms.

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APPENDIX D

EXPLORATORY ANALYSES

Paired Samples *t*-Tests for FGCS

When looking at group differences using independent samples *t*-tests, there was interest in exploratory analyses using paired samples *t*-tests to uncover more of what happened between Time 1 and Time 2 within groups. Unfortunately, there seems to be a similar trend between the start and end of the semester with measures showing an overall decrease in autonomy, identified regulation, intrinsic motivation, behavioral engagement, emotional engagement, and learning involvement, with an increase in both behavioral and emotional disaffection. Across the semester (Time 1 to Time 2) there was a marginal significance with FGCS and autonomy showing their Time 1 autonomy (M = 5.19, SD = 0.75) compared to Time 2 autonomy (M = 4.95, SD = 0.89) decrease $t(54) = 1.89$, $p = .064$, $d = 0.26$, 95% CI [-0.02, 0.52]. Autonomous self-regulations decreased as well from Time 1 to Time 2 with beginning of semester identified regulation (M = 3.72, SD = 0.37) compared to end of semester identified regulation (M = 3.57, SD = 0.44) showing a significant decrease $t(54) = 3.11$, $p = .003$, $d = 0.42$, 95% CI [0.14, 0.69]. This was the same for intrinsic motivation showing beginning of semester (M = 2.67, SD = 0.70) compared to end of semester (M = 2.50, SD = 0.69) a significant decrease $t(54) = 2.23$, $p = .030$, $d = 0.30$, 95% CI [0.03, 0.57]. This trend continues affecting all aspects of learning involvement as well. Over the course of the semester, there is a decrease in both behavioral engagement (T1 M = 3.36, SD = 0.38; T2 M = 3.13, SD = 0.50) which shows significant $t(54) = 4.45$, $p < .001$, $d = 0.60$, 95% CI [0.31, 0.88] and emotional engagement (T1 M = 3.17, SD = 0.45; T2 M = 3.03, SD =

0.50) which also shows significant $t(54) = 2.46$, $p = .017$, $d = 0.33$, 95% CI [0.06, 0.60]. This is reflected in an increase in both behavioral disaffection (T1 $M = 2.79$, $SD = 0.47$; T2 $M = 2.59$, $SD = 0.56$) which shows significant $t(54) = 3.02$, $p = .004$, $d = 0.41$, 95% CI [0.13, 0.68] and emotional disaffection (T1 $M = 2.83$, $SD = 0.54$; T2 $M = 2.60$, $SD = 0.66$) also showing significant $t(54) = 2.51$, $p = .015$, $d = 0.34$, 95% CI [0.07, 0.61]. These results compound and lead to a decrease in overall learning involvement (T1 $M = 12.15$, $SD = 1.44$; T2 $M = 11.35$, $SD = 1.68$) which shows significant $t(54) = 4.11$, $p < .001$, $d = 0.55$, 95% CI [0.27, 0.84]. As FGCS persist throughout the semester there is an overall negative trend that results in being less engaged and more disaffected towards the education process. Tables 7 and 9 detail the significant results in a more digestible manner.

Paired Samples *t*-Tests for CGCS

Exploratory analyses were also done for CGCS to see how they developed between the start and end of the semester. Results are similar, but in some areas CGCS struggled with different aspects. Autonomy is shown to decrease from the start of the semester ($M = 5.05$, $SD = 0.82$) to the end of the semester ($M = 4.84$, $SD = 0.91$) with this decrease being significant $t(147) = 3.18$, $p = .002$, $d = 0.26$, 95% CI [0.10, 0.42]. Another psychological need fulfillment that was affected was competence showing a decrease between beginning ($M = 4.97$, $SD = 0.85$) and end of the semester ($M = 4.83$, $SD = 0.91$), but this was marginally significant $t(147) = 1.86$, $p = .064$, $d = 0.15$, 95% CI [-0.01, 0.32]. Similar to FGCS, identified regulation from the beginning of the semester ($M = 3.63$, $SD = 0.41$) compared to the end ($M = 3.55$, $SD = 0.49$) showed a significant decrease $t(147) = 2.19$, $p = .030$, $d = 0.18$, 95% CI [0.02, 0.34]. This decrease in identified regulation may have been enough to affect the relative autonomy index (RAI) of this group with their RAI decreasing from the beginning ($M = -0.79$, $SD = 2.22$) to the end ($M =$ -

1.05, *SD* = 2.18), but this decrease is marginally significant $t(147) = 1.94$, $p = .055$, $d = 0.16$, 95% CI [-0.003, 0.32]. A similar decrease in engagement and an increase in disaffection unfortunately occurred with CGCS as well. Behavioral engagement was shown to decrease (T1 *M* = 3.37, *SD* = 0.40; T2 *M* = 3.14, *SD* = 0.46) and be significant $t(147) = 7.01$, $p < .001$, $d = 0.58$, 95% CI [0.40, 0.75]. Emotional engagement was also seen to decrease (T1 *M* = 3.07, *SD* = 0.41; T2 *M* = 2.96, *SD* = 0.47) and be significant $t(147) = 3.75$, $p < .001$, $d = 0.31$, 95% CI [0.14, 0.47]. Behavioral disaffection increased similar to how it did for FGCS (T1 *M* = 2.75, *SD* = 0.49; T2 *M* = 2.60, *SD* = 0.50) and was significant $t(147) = 3.94$, $p < .001$, $d = 0.32$, 95% CI [0.16, 0.49]. Unlike FGCS, there was no change in emotional disaffection. CGCS stayed relatively the same throughout the semester. Still, their overall learning involvement was shown to decrease over the semester (T1 *M* = 12.00, *SD* = 1.46; T2 *M* = 11.49, *SD* = 1.58) and this was significant $t(147) = 5.44$, $p < .001$, $d = 0.45$, 95% CI [0.28, 0.62]. Similarly, CGCS show a negative trend in learning involvement aspects and autonomous self-regulation orientations. Perhaps one of the major differences being that CGCS struggled more with perceived levels of autonomy and FGCS with perceived levels of competence. Tables 8 and 9 detail the significant results in a more digestible manner.

Table 7

Paired Samples t-Test Results for 55 FGCS Comparing Time 1 to Time 2

Measure	*t*(54)	*p*	*d*
Autonomy	1.89	.064[a]	0.26
Identified Regulation	3.11	.003**	0.42
Intrinsic Motivation	2.23	.030*	0.30
Behavioral Engagement	4.45	< .001***	0.60
Behavioral Disaffection	3.02	.004**	0.41
Emotional Engagement	2.46	.017*	0.33
Emotional Disaffection	2.51	.015*	0.34
Learning Involvement	4.11	< .001***	0.55

Note. *t*(54) indicates the degrees of freedom associated with the *t*-test. *p* indicates the significant value. Cohen's *d* indicates the level of effect present; 0.2 = small, 0.5 = medium, 0.8 = large. * indicates $p < .05$. ** indicates $p < .01$. *** indicates $p \leq .001$. Superscript "a" indicates *p* = marginal significance (.06 – 1.0).

Table 8

Paired Samples t-Test Results for 148 CGCS Comparing Time 1 to Time 2

Measure	*t*(147)	*p*	*d*
Autonomy	3.18	.002**	0.26
Competence	1.86	.064[a]	0.15
Identified Regulation	2.19	.030*	0.18
Relative Autonomy Index	1.94	.055[a]	0.16
Behavioral Engagement	7.01	< .001***	0.58
Behavioral Disaffection	3.94	< .001***	0.32
Emotional Engagement	3.75	< .001***	0.31
Learning Involvement	5.44	< .001***	0.45

Note. *t*(147) indicates the degrees of freedom associated with the *t*-test. *p* indicates the significant value. Cohen's *d* indicates the level of effect present; 0.2 = small, 0.5 = medium, 0.8 = large. * indicates $p < .05$. ** indicates $p < .01$. *** indicates $p \leq .001$. Superscript "a" indicates *p* = marginal significance (.06 – 1.0).

Table 9

Paired Samples t-Test Results Comparing 55 FGCS to 148 CGCS

		Time 1		Time 2		
	Measure	*M*	*SD*	*M*	*SD*	*p*
FGCS						
	Autonomy	5.19	0.75	4.95	0.89	.064[a]
	Identified Regulation	3.72	0.37	3.57	0.44	.003**
	Intrinsic Motivation	2.67	0.70	2.50	0.69	.030*
	Behavioral Engagement	3.36	0.38	3.13	0.50	< .001***
	Behavioral Disaffection	2.79	0.47	2.59	0.56	.004**
	Emotional Engagement	3.17	0.45	3.03	0.50	.017*
	Emotional Disaffection	2.83	0.54	2.60	0.66	.015*
	Learning Involvement	12.15	1.44	11.35	1.68	< .001***
CGCS						
	Autonomy	5.05	0.82	4.84	0.91	.002**
	Competence	4.97	0.85	4.83	0.91	.064[a]
	Identified Regulation	3.63	0.41	3.55	0.49	.030*
	Relative Autonomy Index	-0.79	2.22	-1.05	2.18	.055[a]
	Behavioral Engagement	3.37	0.40	3.14	0.46	< .001***
	Behavioral Disaffection	2.75	0.49	2.60	0.50	< .001***
	Emotional Engagement	3.07	0.41	2.96	0.47	< .001***
	Learning Involvement	12.00	1.46	11.49	1.58	< .001***

Note. * indicates $p < .05$. ** indicates $p < .01$. *** indicates $p \leq .001$. Superscript "a" indicates p = marginal significance (.06 – 1.0).