Self-Regulation as a Key Factor in Academic Motivation for Undergraduate Students in the United States

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Abstract

Some undergraduate students exhibit a lack of academic motivation, which adversely affects their engagement and persistence in higher education (Busse & Walter, 2017; Rizkallah & Seitz, 2017; Dresel & Grassinger, 2013). Students lacking motivation are more likely to withdraw from school or disengage from learning activities, leading to underachievement (Wang & Pomerantz, 2009). Although there is a correlation between low academic motivation and deficiencies in self-regulation, relatively few studies have explored the impact of self-regulation on academic motivation, particularly in the U.S. This study seeks to investigate the role of self-regulation in fostering academic motivation. The sample comprised 349 undergraduate students from U.S. universities, recruited through the online platform QuestionPro. Participants completed the Academic Motivation Scale (AMS) and the Motivated Strategies for Learning Questionnaire (MSLQ) online, providing insights into their levels of academic motivation and self-regulation. Structural equation modeling was utilized to assess the influence of self-regulation on academic motivation. Data analysis revealed that the initial model did not fit the data well, with a Chi-square value of 271.569 (df = 40, p = .000) and poor fit indices (GFI = .875, NFI = .874, CFI = .889, RMSEA = .129, SRMR = .090). An exploratory analysis was conducted, and modifications were made based on modification indices and theoretical considerations to enhance the fit indices. The revised model demonstrated an acceptable fit between the theoretical and empirical covariance matrices (GFI = .918, NFI = .913, CFI = .928, RMSEA = .108, SRMR = .072), indicating that the data aligned with the hypothesized model. The overall adjusted model accounted for 41% of the variance in academic motivation, with self-regulation ($\beta = .24$; p < .01) identified as a significant predictor. The findings suggest that self-regulation can effectively predict students' academic motivation. Specifically, students employing advanced self-regulation strategies—such as time management, study environment optimization, and effort regulation—demonstrated higher levels of academic motivation. Further research is needed to identify additional factors that may influence academic motivation among students. This study provides recommendations for future research and professional practice.

التنظيم الذاتي كعامل رئيسي في الدافعية الأكاديمية لطلاب الجامعة في الولايات المتحدة الملخص

بعض الطلاب الجامعيين يظهرون نقصًا في الدافعية الأكاديمية، مما يؤثر سلبًا على مشاركتهم ومثابرتهم في التعليم العاليBusse & Walter, 2017؛ إRizkallah & Seitz, 2017؛ (Busse & Walter, 2017)

. (2013الطلاب الذين يفتقرون إلى الدافعية هم أكثر عرضة للتسرب من المدرسة أو الابتعاد عن الأنشطة التعليمية، مما يؤدي إلى تحقيق نتائج ضعيفة .(2009) ولايتعاد عن الأنشطة (Wang & Pomerantz, 2009) على الرغم من وجود ارتباط بين نقص الدافعية الأكاديمية ونقص التنظيم الذاتي، إلا أن الدراسات التي تستكشف تأثير التنظيم الذاتي على الدافعية الأكاديمية، خصوصًا في الولايات المتحدة، لا تزال قليلة. تهدف هذه الدراسة إلى البحث في دور التنظيم الذاتي، والاتحدة في تعريف من وجود ارتباط الذاتي في على الرغم من وجود ارتباط الذاتي على الدافعية الأكاديمية ونقص التنظيم الذاتي، إلا أن الدراسات التي تستكشف تأثير التنظيم الذاتي على الدافعية الأكاديمية، في دور التنظيم الذاتي في تعريز الدافعية الأكاديمية، في دور التنظيم الذاتي في تعريز الدافعية الأكاديمية الأكاديمية.

تكونت العينة من 349 طالبًا جامعيًا من الجامعات الأمريكية، تم اختيارهم عبر منصة QuestionPro على الإنترنت. أكمل المشاركون مقياس الدافعية الأكاديمية (AMS) واستبيان استراتيجيات التعلم المحفزة (MSLQ) عبر الإنترنت، حيث قدموا معلومات حول مستويات دافعيتهم الأكاديمية وتنظيمهم الذاتي. تم استخدام نمذجة المعادلات الهيكلية لتقييم تأثير التنظيم الذاتي على الدافعية الأكاديمية.

أظهرت تحليلات البيانات أن النموذج الأولي لم يتناسب جيدًا مع البيانات، حيث كانت قيمة CFI = ،NFI = .874) ، (GFI = .875 ضعيفة 875. = RT) ، .875، (000. = مع مؤشرات ملائمة ضعيفة 875. = 875) ، .874. (271.569 (df = 40 د.889) ، .889. وتم إجراء تعديلات بناءً على مؤشرات التعديل والنظرية لتحسين مؤشرات الملائمة. أظهر النموذج المعدل ملاءمة مقبولة بين مصفوفتي SRMR = ،RMSEA = .108 ،CFI = .928 ،NFI = .913) ، SRMR = .805. ما يدل ملاءمة مقبولة بين مصفوفتي داخليل استكشافي، وتم إجراء تعديلات بناءً على مؤشرات التعديل والنظرية لتحسين مؤشرات الملائمة. أظهر النموذج المعدل ملاءمة مقبولة بين مصفوفتي SRMR = .805. ما يدل والنظرية والتجريبية GFI = .913) ، SRMR = .805. مؤشرات الملائمة. أظهر النموذج المعدل ملاءمة مقبولة بين مصفوفتي دائيان النظرية والتجريبية 300. (GFI = .913) ، .915. [GFI = .928. NFI = .913] ، .015. [GFI = .915. ما يدل على أن البيانات تتماشى مع النموذج المفترض. أوضح النموذج المعدل بشكل عام 40% من تباين الدافعية الأكاديمية، حيث تم تحديد التنظيم الذاتي 24. [G50. حمالي النائي الدافعية الأكاديمية، حيث تم تحديد النتظيم الذاتي 24. [G50. حمالي المعدل ما معدل بشكل عام 40% من تباين الدافعية الأكاديمية، حيث تم تحديد النتظيم الذاتي 24. [G50. حمالي المعدل بشكل عام 40% من تباين الدافعية الأكاديمية، حيث تم تحديد النتظيم الذاتي 24. [G50. حمالي 20. حمالي المعدل بشكل عام 40% من تباين الدافعية الأكاديمية، حيث تم تحديد النتظيم الذاتي 24. [G50. حمالي 20. حمالي 20. حمالي 20. حمالي 20. حمالي 20. حمالي 20. [G50. [G50.

تشير النتائج إلى أن التنظيم الذاتي يمكن أن يتنبأ بفعالية بالدافعية الأكاديمية لدى الطلاب. بشكل خاص، أظهر الطلاب الذين يستخدمون استراتيجيات تنظيم ذاتي متقدمة—مثل إدارة الوقت، وتحسين بيئة الدراسة، وتنظيم الجهد—مستويات أعلى من الدافعية الأكاديمية. هناك حاجة لمزيد من الأبحاث لتحديد عوامل إضافية قد تؤثر على الدافعية الأكاديمية بين الطلاب. تقدم هذه الدراسة توصيات للأبحاث المستقبلية والممارسات المهنية.

Introduction

Motivation is a crucial psychological concept that significantly impacts education. Psychologists understand motivation through various perspectives—humanistic (Maslow, 1943), behaviorist (Skinner, 1953), and social-cognitive (Bandura, 1991). Generally, motivation reflects an individual's drive and willingness to engage in various functions, promoting social involvement and personal responsibility (Tabernero & Hernandez, 2011). A high level of motivation increases the likelihood of individuals meeting specific standards (Bandura, 1991). It is a key influence on educational outcomes, with motivated students valuing learning activities and achieving positive performance (Zimmerman, 2008; 2000b). Motivation encourages individuals to adopt systematic and deep approaches to learning (Prat-Sala & Redford, 2010).

Self-regulation, defined as an individual's ability to control emotional, behavioral, and cognitive functions (Zimmerman, 1998), plays a vital role in academic success. Those who can self-regulate exhibit better control over their behaviors, manage impulsivity, and adapt to changes (Zimmerman, 1998). This ability enhances social interactions, psychological health, and academic performance. Klapp (2016) highlights self-regulation's importance in reducing negative emotions, with a strong impact on both intrinsic and extrinsic motivation. Pintrich and Schunk (1996) noted that goal orientation, as a self-regulation process, enhances intrinsic motivation more than external rewards.

Self-regulation and academic motivation are interconnected, influencing one another. For instance, employing self-regulatory strategies can enhance students' academic motivation. Kormos and Csizer (2014) proposed a model suggesting that motivational factors—such as learning purpose, effort orientation, and personal belief—effectively promote self-regulation. However, there is limited research analyzing the complex relationships between self-regulation and academic motivation. This study investigates a hypothesized model that describes these relationships within the framework of social-cognitive theory.

Rationale for the Study

Enrollment in higher education represents a transitional phase where students face challenges in adapting to a new educational system alongside other responsibilities (Busse & Walter, 2017; Wang & Pomerantz, 2009). Students often experience maladaptive changes in motivation, which negatively affects their academic success, retention, and engagement in learning activities (Dresel & Grassinger, 2013). Various factors influence academic motivation, including faculty feedback, campus activities, educational environment (Rowell & Hong, 2013), self-esteem, emotional regulation, and goal commitment (Zimmerman, 1998). While self-regulation contributes to academic motivation (Bandura, 1991; Deci & Ryan, 2008), few studies have explored this relationship among university students in the U.S., with most research conducted in cultures like Iran, Africa, and Hong Kong (Alafgani & Purwandari, 2019; Lavasani et al., 2011; Ning & Downing, 2010).

Statement of the Problem

Evidence suggests that students' motivation to learn decreases throughout their academic years (Busse & Walter, 2017; Dresel & Grassinger, 2013; Rizkallah & Seitz, 2017). This lack of motivation adversely affects academic performance and can lead to disengagement, underachievement, or dropout (Wang & Pomerantz, 2009). First-year university students show significant declines in academic motivation and self-concept, negatively impacting their self-regulatory strategies (Dresel & Grassinger, 2013; Wang & Pomerantz, 2009).

The absence of motivation inhibits the development of self-regulatory strategies, such as goal setting and planning (Ben-Eliyahu, 2011). A lack of motivation also diminishes students' performance and enthusiasm, resulting in decreased productivity and creativity. This highlights the interdependence of motivation and self-regulation in enhancing learning outcomes. Impaired self-regulation can negatively affect academic achievement and mental health, with significant implications such as depression and substance abuse (Eisenberg et al., 2007; Baron, 2003). Low selfregulation correlates with various issues, including financial problems, obesity, and addiction (Kruglanski & Higgins, 2007).

Purpose of the Study

The purpose of this study was to examine a theoretical model that explores the influence of self-regulation on academic motivation. Specifically, the study aimed to create a hypothesized model of the relationship between these variables and to collect and analyze data on the self-regulation and academic motivation of undergraduate students using Structural Equation Modeling (SEM).

Conceptual Framework

The conceptual framework for this study is based on Bandura's Social Cognitive Theory (SCT) and the Self-Determination Theory (SDT) proposed by Deci and Ryan.

• Social Cognitive Theory (SCT)

According to SCT, humans learn within a social context, where social interactions influence the initiation and attainment of behaviors. The triadic reciprocal determinism of SCT assumes that behavior, internal factors, and the environment interact during the learning process. Therefore, self-regulatory abilities significantly affect academic motivation. Individuals observe models that demonstrate specific behaviors, which leads them to set goals and become motivated to engage in task performance. However, observation alone is insufficient for effective performance; experience plays a critical role in monitoring one's performance and cognitive functions. Mastering a wide range of experiences enhances individuals' belief in their abilities, thereby improving their self-regulation and motivation (Bandura, 1991).

• SCT and Self-Regulation

Bandura (1994) defines self-regulation as the human tendency to achieve a sense of agency, wherein individuals believe in their capacity to control their actions and environment. Effective self-regulation processes rely on self-monitoring, self-evaluation, and self-reaction (Zimmerman & Moylan, 2009). The cyclical model of self-regulation consists of three main phases: forethought, performance, and self-reflection. In the forethought phase, individuals motivate themselves and organize their performance. During the performance phase, they implement selected strategies and monitor their progress. The self-reflective phase involves evaluating outcomes and making attributions based on those outcomes.

This cyclical model illustrates the reciprocal interactions among personal, behavioral, and environmental influences (Usher & Schunk, 2018). If learners discover that their strategies were effective, they return to the performance phase; if modifications are needed, they revisit the forethought phase to adopt new strategies. Deliberate thinking guides the self-regulatory process by considering emotional and motivational factors, emphasizing the importance of attention for successful self-regulation (Zimmerman & Moylan, 2009).

• SCT and Academic Motivation

The ability to regulate motivation and action is crucial for developing academic motivation. Setting goals and planning alone are insufficient for effective

performance (Bandura, 1991). Engaging in self-evaluative processes, where individuals compare their outcomes to personal standards, produces self-reactive influences, including self-satisfaction and self-set goals. Effective self-reactive influences positively motivate individuals, enhancing their drive to accomplish desired behaviors.

Academic motivation is influenced by internal beliefs, cognitions, and social interactions. Factors such as outcome expectancies and the value placed on learning activities significantly affect motivation. Students who acknowledge the importance of learning tasks and value their outcomes are more likely to engage in academic activities.

Self-Determination Theory (SDT)

SDT, developed by Deci and Ryan (1985), illustrates human motivation through the fulfillment of three main psychological needs: competency, relatedness, and autonomy. Competency relates to the ability to perform effectively, while relatedness involves connecting thoughts and behaviors with social norms. Autonomy refers to the ability to initiate and regulate one's performance.

SDT distinguishes between three types of motivation: intrinsic motivation (engaging in behaviors for personal satisfaction), extrinsic motivation (integrating behavior's value into the self), and controlled motivation (influenced by external factors). An autonomy continuum explains the processes of internalization, emphasizing the role of fulfilling the needs of relatedness, competence, and autonomy.

• SDT and Self-Regulation

SDT posits an autonomy continuum that differentiates between self-regulation (autonomy) and external regulation (heteronomy). Autonomously oriented individuals engage in performance based on their interest in and value for the outcomes of activities. In contrast, those with controlled motivation act due to external pressures.

Creating an environment that satisfies autonomy, competence, and relatedness can promote self-regulation. Students who perceive autonomy support from teachers and parents tend to develop higher levels of motivation and engagement in learning activities.

SDT and Academic Motivation

SDT highlights intrinsic motivation as a fundamental driver of self-determined behavior. Self-determined students are more likely to engage in learning activities and achieve positive academic outcomes. Studies indicate that students with intrinsic motivation demonstrate greater conceptual learning and enjoyment in academic settings compared to those driven by external rewards.

An autonomy-supportive approach enhances academic motivation by facilitating the internalization of external regulation into intrinsic motivation. Teachers who provide constructive feedback and allow students to make choices in their learning foster an environment conducive to academic success.

Research Questions

This exploratory study examined a hypothesized model of the influence of selfregulation on academic motivation among undergraduate students in the United States. The primary research question was, "Are the theoretical covariance matrix and the empirical or observable covariance matrix equal?" This main question addressed whether the hypothesized theoretical model was a good fit for the sample. The subresearch questions were:

- 1. Was there a significant correlation between self-regulation and academic motivation?
- 2. Did self-regulation affect academic motivation?

Research Hypotheses

The main hypothesis of this study was that the reproduced covariance matrix proposed in the theoretical model and the observed sample covariance matrices were equal. In simple terms, this meant that the structural model would be a good fit with the observed data. Using the conceptualized model depicted in Figure 2, this study hypothesized (1) there was a significant correlation between self-regulation and academic motivation; (2) self-regulation had a significant direct effect on the endogenous variable academic motivation.

Significance of the Study

The significance of this study is underscored by the growing demand for higher education across various societies. Higher education aims not only to provide knowledge but also vocational training to prepare qualified members of society. However, current statistics indicate a decline in enrollment in higher education. Researchers found that university students often underachieve or drop out due to difficulties in adapting during the transition from secondary to higher education (Wang & Pomerantz, 2009). A key reason for this phenomenon is students' lack of motivation to learn and effective self-regulatory mechanisms (Busse & Walter, 2017; Dresel & Grassinger, 2013; Rizkallah & Seitz, 2017).

The findings of this study could benefit society and governments by providing insights into critical variables that influence students' motivation in higher education. This knowledge may lead to a decrease in dropout rates and an increase in the number of graduates contributing positively to society.

Furthermore, the results can assist policymakers and higher education personnel in enhancing academic motivation by focusing on effective self-regulatory processes. The study aims to increase understanding of factors impacting students' motivation to learn, providing faculty and students with strategies related to developing motivation. Instructors can plan lectures that integrate self-regulatory strategies, while students can work on enhancing their self-regulatory practices.

Despite existing research on academic motivation, few studies have specifically examined the role of self-regulation in this context. This study justifies further

exploration of these variables and can guide future research on academic motivation among diverse populations.

- Definition of Terms
- Academic Motivation: The intrinsic or extrinsic orientation that drives individuals to set goals and prepare plans to achieve academic success (Ryan & Deci, 2000; Vallerand et al., 1992).
- **Amotivation**: The tendency to disengage from activities due to a lack of desire or value for the outcomes (Vallerand et al., 1992).
- **Control of Learning Beliefs**: Students' beliefs in their ability to control their effort, attributing success to their own actions rather than external factors (Pintrich et al., 1993).
- **Effort Regulation**: The ability to manage oneself during learning processes despite obstacles (Pintrich et al., 1993).
- **External Regulation**: Factors that drive behavior to obtain rewards or avoid punishment (Vallerand et al., 1992).
- **Extrinsic Motivation**: Factors that enhance the desire to perform effectively for academic success, such as rewards (Ryan & Deci, 2000; Vallerand et al., 1992).
- **Identified Regulation**: Engagement in behavior based on its value and personal reasons (Vallerand et al., 1992).
- **Intrinsic Motivation**: The internal desire to engage in academic activities for personal satisfaction (Ryan & Deci, 2000; Vallerand et al., 1992).
- Metacognitive Self-Regulation: The ability to use effective strategies to control and regulate performance, including goal-setting and monitoring (Pintrich et al., 1993).
- **Self-Regulation**: The ability to control emotional, cognitive, and behavioral responses to achieve goals (Bandura, 1991; Zimmerman, 2000a).
- **Time and Study Environment Management**: Effective use of study time and preparation of a conducive study environment (Pintrich et al., 1993).

Delimitations of the Study

This study focused on undergraduate students aged 18–22 years. While academic motivation is influenced by various psychological and social factors, the primary emphasis was on the effect of self-regulation on academic motivation. A structural model was used to analyze and interpret the data, concentrating on the predictive roles of self-regulation in academic motivation.

• Literature Review

Motivation

The concept of motivation has deep roots in ancient philosophy, particularly with thinkers like Plato and Aristotle. Plato proposed a hierarchy of motivations based on emotional, rational, and dietary components, while Aristotle viewed these components as drivers of human behavior (Gollwitzer & Oettingen, 2001). Descartes

(2008) later emphasized the power of will as a more effective motivator than physical needs, suggesting that mental and moral mechanisms drive human actions (Gollwitzer & Oettingen, 2001).

In the early 20th century, Sigmund Freud introduced the idea that human behavior is driven by instinctual needs, positing that individuals act to satisfy physiological needs to alleviate stress (Freud, 1924). However, behaviorists like Pavlov and Skinner challenged this view, focusing on environmental influences and reinforcement as primary motivators of behavior (Rensh et al., 2020).

Behavioral Perspectives

Behaviorism explains motivation through the stimulus-response model, where environmental factors and reinforcements guide human actions. Theories from Pavlov, Thorndike, Watson, and Skinner emphasize that behavior is shaped by external stimuli and the consequences of actions (Rensh et al., 2020).

Humanistic Perspectives

Humanistic theories, notably Maslow's hierarchy of needs, suggest that individuals are motivated by a series of needs ranging from physiological to self-actualization (Maslow, 1943). McClelland (1987) further explored how needs for power, achievement, and affiliation influence behavior, while Alderfer's ERG theory condensed Maslow's hierarchy into three categories: Existence, Relatedness, and Growth (Alderfer, 1972).

Cognitive Psychology

Cognitive psychology has significantly contributed to understanding motivation.. The concept of locus of control, introduced by Rotter, differentiates between internal and external motivators, influencing how individuals perceive their ability to control outcomes (Rotter, 1966).

Academic Motivation

Academic motivation is crucial for student engagement and performance. It encompasses beliefs, values, and goals that drive students to participate in learning activities. Key components include self-regulation, autonomy, and attributional beliefs, which significantly impact students' persistence and effort in academic tasks (Rowell & Hong, 2013).

Self-Regulation

Self-regulation has evolved through various theoretical frameworks. Initially discussed in behaviorist terms, it later incorporated cognitive perspectives. Zimmerman defined self-regulation as a metacognitive construct involving planning, monitoring, and reflection on one's learning processes (Zimmerman, 2008). This evolution highlights the importance of self-regulation in educational contexts.

The Relationship Between Self-Regulation and Academic Motivation

The cyclical model of self-regulated learning posits a reciprocal relationship between self-regulation and motivation. Research indicates that self-regulation enhances motivation, which in turn influences academic performance. For instance, studies have shown that positive academic emotions correlate with both self-regulated learning and academic motivation, while negative emotions can hinder these processes (Valinasab & Zeinali, 2018; Ariani, 2016).

Conclusion

Understanding self-regulation as a predictor of academic motivation is essential, particularly among diverse undergraduate populations in the United States. Future research should further explore the dynamics between these constructs to improve educational outcomes and support student success.

• Methodology

This study utilized a model based on Social Cognitive Theory (SCT) to hypothesize that self-regulation (including metacognitive self-regulation, time and study environment management, and effort regulation) predicts academic motivation (intrinsic motivation, extrinsic motivation, and amotivation).

Design

A non-experimental quantitative methodology was employed, developing a theoretical model based on SCT and Self-Determination Theory (SDT) to explore the relationship between self-regulation and academic motivation. A correlational design was adopted to examine how one variable might predict variance in another. Specifically, a model-testing design was implemented to assess the proposed relationships.

• Population and Sample

In fall 2018, approximately 16.6 million students were enrolled in U.S. higher education institutions (Hussar et al., 2020). A non-probability sampling method was used, focusing on convenience sampling to select participants based on availability. The survey was conducted online through QuestionPro, targeting those with internet access.

The study included:

- 1. A demographic information questionnaire.
- 2. 24 items measuring self-regulation.
- 3. 28 items measuring academic motivation.

The sample size was determined by multiplying the number of survey items by five, resulting in a target of 330 participants. A total of 349 students participated, sufficient for conducting Structural Equation Modeling (SEM).

• Research Hypotheses

The main hypothesis stated that the covariance matrix from the theoretical model would match the observed sample covariance matrices. The study proposed:

- 1. A significant correlation between self-regulation and academic motivation.
- 2. Self-regulation has a significant direct effect on academic motivation.

• Definition of Variables

Academic Motivation

Academic motivation (AM) was defined as the intrinsic or extrinsic orientation that drives engagement in academic behavior. This latent variable was measured using 28 items from the Academic Motivation Scale (AMS) (Vallerand et al., 1992) encompassing external regulation, introjected regulation, identified regulation, intrinsic motivation-knowledge, intrinsic motivation-accomplishment, intrinsic motivation-stimulation, and amotivation.

• Self-Regulation (SR)

Self-regulation was defined as the metacognitive strategies through which students manage their cognition, effort, time, and environmental resources (Garcia & McKeachie, 2005). This latent variable was measured by:

- **Metacognitive Self-Regulation**: Ability to monitor and control cognitive strategies (Pintrich et al., 1993).
- **Time and Study Environment Management**: Effective use of study time and avoidance of distractions (Pintrich et al., 1993).
- **Effort Regulation**: Ability to persist through challenges to achieve goals (Pintrich et al., 1993).

• Instrumentation

The study utilized four sections:

- 1. **Demographic Information**: Age, gender, ethnicity, and employment.
- 2. Academic Motivation scale: Measured using the AMS (Vallerand et al., 1992), consisting of seven subscales totaling 28 items on a 7-point Likert scale.
- 3. **Self-Regulation scale**: Measured using the Motivated Strategies for Learning Questionnaire (MSLQ) (Pintrich et al., 1993), assessing motivation and learning strategies.

• Data Collection

Approval was obtained from Andrews University's Institutional Review Board. Surveys were hosted online, with participants provided informed consent regarding the study's purpose, their rights, and data confidentiality.

• Analysis of the Data

Statistical analysis was conducted using SPSS and IBM SPSS Amos. The study aimed to test whether self-regulation predicted academic motivation using SEM and maximum likelihood estimation (MLE).

Advantages of Using SEM

SEM was chosen for its ability to model complex relationships involving multiple dependent variables while accounting for measurement errors.

Data Screening

Data was screened for outliers and missing values. Cases with missing data were deleted to maintain statistical power.

Model Specification

The hypothesized model was developed using IBM SPSS Amos, representing latent variables as ovals and measured variables as rectangles.

Assessing Model Fit

The measurement model was initially tested using Confirmatory Factor Analysis (CFA). Following that, path analysis assessed relationships among constructs. The fit of the model was evaluated using various fit indices, including chi-square, RMSEA, SRMR, GFI, NFI, IFI, and CFI (Keith, 2019; Meyers et al., 2016).

Model Modification

If the model does not indicate a good fit with the data, it can be improved to fit the data. The modification would be through checking the modification indices and connecting the suggested errors if they are logically correlated.

• **RESULTS**

This study hypothesized that self-regulation predicts academic motivation among undergraduate students in the United States. The model suggested self-regulation, measured by metacognitive regulation (SRM), time and study environment management (SRTE), and effort regulation (SREF), influences academic motivation, indicated by various intrinsic and extrinsic motivation subscales. This chapter presents demographic characteristics, descriptive statistics, analysis procedures, and results of the structural equation modeling (SEM).

• Data Screening

Out of 1,582 viewers, 352 participants completed the survey after excluding those who did not meet the criteria (undergraduate students aged 18-22). Three cases with missing data were eliminated, resulting in 349 participants for analysis.

• Demographic Characteristics

The sample consisted of 349 undergraduate students aged 18-22, with 80.2% female and 19.8% male. The racial breakdown was predominantly Caucasian (62.2%), followed by Black or African American (10.6%), Asian (10.6%), Hispanic or Latino (8.9%), Multiracial (3.4%), and American Indian or Alaska Native (1.4%). Employment status showed that 73.3% were unemployed, 18.9% employed part-time, and 7.7% employed full-time.

Table 1

Variable		Ν	%
Gender			
	Male	69	19.8
	Female	280	80.2
	Total	349	100
Employment			
	Full-time employment	27	7.7
	Part-time employment	66	18.9
	Unemployed	7	2
	Student	249	71.3
	Total	349	100
Ethnicity			
	Hispanic or Latino	31	8.9
	American Indian or Alaska Native	5	1.4

Demographic Characteristics of Participants in the Data

Variable		Ν	J %	
	Asian	37	10.6	
	Black or African American	37	10.6	
	Native Hawaiian or Other Pacific Islander	2	0.6	
	Caucasian or White	217	62.2	
	Multiracial	12	3.4	
	Other	1	0.3	
	Prefer not to say	7	2	
	Total	349	100	

0

Observed Variables Description

Table 2 presents the descriptive statistics of the observed variables including means and standards deviations. Metacognitive self-regulation (M = 4.25, SD = 0.86), time and study environment management (M = 4.48, SD = 0.74), effort regulation (M = 4.15, SD = 0.79), control of learning beliefs (M = 4.24, SD = 1.04), extrinsic motivation external regulation (M = 5.31, SD = 1.19), extrinsic motivation identified (M = 5.53, SD = 1.12), extrinsic motivation integrated (M = 5.17, SD = 1.33), intrinsic motivation to know (M = 5.01, SD = 1.24), intrinsic motivation to experience stimulation (M = 3.95, SD = 1.39), intrinsic motivation to accomplish (M = 4.59, SD = 1.32), and amotivation (M = 2.77, SD = 1.67).

• Zero-Order Correlations

Table 2 reveals significant correlations among several variables with p-values less than .05. Most correlations were weak to moderate. Notable non-significant correlations included extrinsic motivation external regulation (ExME) and intrinsic motivation to experience stimulation (InMS), as well as control of learning beliefs (SEC) and effort regulation (SREF).

Table 2

	ExME	ExMN	ExMD	InMK	InMC	InMS	AMOT	SMR	SRTE	SREF	SEC
ExME		.473**	.580**	.332**	.246**	-0.01	287**	.120*	.296**	.185**	.162**
ExMN			.523**	.546**	.635**	.335**	230**	.285**	.256**	.263**	.156**
ExMD				.579**	.486**	.201**	521**	.298**	.458**	.323**	.133*
InMK					.733**	.534**	354**	.462**	.389**	.341**	.135*
InMC						.617**	224**	.485**	.275**	.281**	.266**
InMS							.111*	.418**	0.096	0.092	.188**

Measured Variables Correlation and Descriptive Statistics

Self-Regulation as a Key Factor in Academic Motivation	n for Undergraduate Students in the United States
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	ExME	ExMN	ExMD	InMK	InMC	InMS	AMOT	SMR	SRTE	SREF	SEC
AMOT								134*	472**	490**	.191**
SMR									.491**	.424**	.253**
SRTE										.678**	0.023
SREF											-0.036
SEC											
Mean	5.31	5.17	5.53	5.01	4.59	3.95	2.77	4.25	4.48	4.15	4.24
SD	1.18	1.32	1.11	1.24	1.32	1.38	1.67	0.86	0.73	0.79	1.03
Skewness	-0.58	-0.56	-0.69	-0.19	-0.24	-0.01	0.52	-0.16	-0.39	0.3	-0.25

• Hypotheses Testing

To examine the null hypotheses, which indicates that the structural covariance matrix is equivalent to the empirical covariance matrix, SEM with Maximum Likelihood estimation (MLE) method was conducted. The SEM that was configured for the present study, based on the data from 349 undergraduate student participants, is shown in Figure 3. It was conducted to investigate the hypothesis that selfregulation predicts academic motivation. All these variables were latent variables in this model. The model specified two

direct paths from self-regulation to academic motivation. The latent variable of academic motivation, used as the outcome variable in the model, was indicated by seven of the subscales of AMS—intrinsic motivation to know, intrinsic motivation to accomplish, intrinsic motivation to stimulate, extrinsic motivation integrated, extrinsic motivation identified, extrinsic motivation, external regulation, and amotivation.

Fit indices demonstrated a statistically significant Chi-square with a value of 271.569, df = 40, p = .000, indicating that this hypothesized model did not fit our data because the Chi-square value is very large. In addition, GFI = .875, NFI = .874 and CFI = .889, indicated a poor fit because all values were less than 0.9. Most importantly, RMSEA (.129) and SRMR (.090)

• The Adjusted Model

I considered modification indexes and theory before developing an adjusted model. Error term correlation was observed between same scale items, a significant factor loading of SEC and AMOT on SR. Heywood case was observed in SELP and the variance error was fixed to 0. Finally, a significant error term correlation between SEC and AMOT was included assuming that shared variance between these items was not explained by the model. An adjusted SEM that fit the data much better emerged (see Figure 4). A Chi-square with a value of 187.547, df = 37, p = .000 was

obtained. However, because of the sensitivity of Chi-square to the sample size and the complexity of the model other fit indices were considered (Schermelleh-Engel et al., 2003, Vandenberg, 2006).

Other fit indices that were significantly better than those in the original model were considered. The GFI improved to .918, the NFI improved to .913 and the CFI improved to .928. The RMSEA and SRMR dropped to .108 and .072, respectively, both values were well within an acceptable range. Therefore, this last model adequately fitted the data and was much better than the original SEM. The model configuration accounted for approximately 41% (R2 = .407) of the variance of academic motivation.

In terms of the measurement model, all the pattern coefficients linking the measured variables to their latent variables were statistically significant. In the adjusted model, there were two significant paths between self-regulation (SR) and amotivation (AMOT); and between self-regulation (SR) and control of learning beliefs (SEC). This result was based on the psychometric characteristics of the items used, so self-regulation (SR) was not only the explanation for some proportion of the variance in metacognitive self-regulation (SMR), time and study environment management (SRTE), and effort-regulation (SREF), but also in control of learning beliefs (SEC) and amotivation (AMOT).

The construct model indicated that the exogenous variables were significantly correlated (r = .69, p < .01) as expected. This indicated that self-regulation has a statistically significant correlation. In addition, the direct path from self-regulation to academic motivation was statistically significant (standardized coefficient = .236 unstandardized coefficient = .106 with a standard error of .036, p = .003), indicating that self-regulation predicts ($\beta = .24$; p < .01) academic motivation. Self-regulation ($\beta = .24$; p < .01) was the lowest predictor of academic motivation. There was a correlation between error five and error 12 indicating that there was some variance between control of learning beliefs and amotivation that could be explained by this model.

• Summary of Findings

The SEM techniques were conducted to determine if the theoretical covariance matrix and the imperial covariance matrix were equal. The hypothesized model for this study did not statistically fit the collected data. As a result, some modifications were made to improve the model. The modified model statistically fitted the data (GFI = .918, NFI = .913, CFI = .928, RMSEA = .108 SRMR = .072). Self-regulation has a statistically significant correlation (r = .69, p < .01).

The results of the study were presented in this chapter. First, the demographic characteristics of the sample, in addition to data screening, were illustrated. Second, the observed variables, including means and standard deviation, were described. Third, the analysis of SEM was demonstrated for both the hypothesized model and the modified model.

Conclusion

Students' academic motivation is an essential component for achievement and knowledge attainment in higher education. Intrinsically motivated students will be interested not only in obtaining theoretical knowledge from study materials but also in engaging in occupational practices related to the field of study. The current study sought to examine a hypothesized model, based on SCT and SDT, to determine the influence of self-regulation in academic motivation. According to SEM analysis, the initial model did not fit the observed data, therefore, an adjusted model was developed based on exploratory analysis and modification indices. The adjusted model with a Chi-square value of 187.547 (df = 37, p = .000) adequately fitted the data as acceptable criterion fit indices were met (GFI = .918, NFI = .913, CFI = .928, RMSEA = .108, and SRMR = .072). The adjusted model explained 41% of the variance in academic motivation.

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- Limitations of the Study
 - 1. **Sampling Method**: The use of convenience sampling limits the generalizability of the findings.
 - 2. **Gender Imbalance**: With 80.2% of participants being female, results may not represent the entire population.
 - 3. **Psychological Factors**: Key factor like self-regulation, which explain a significant variance in academic motivation, were not included.
 - 4. **Self-Report Bias**: Participants may have altered responses to appear more favorable due to the self-report questionnaire format.
 - 5. Likert Scale Interpretation: Misinterpretation of scale points could lead to varied responses, affecting data reliability.
 - 6. **Sample Specificity**: Results may differ across regions and academic years, limiting broader applicability.
- Recommendations for Educational Practice
 - 1. **Curriculum Development**: Design curricula that promote self-regulation through metacognitive strategies and varied activities.
 - 2. Clear Course Objectives: Faculty should articulate clear objectives and structured syllabi to enhance students' planning and motivation.
 - 3. **Supportive Learning Environment**: Create an autonomy-supportive atmosphere that encourages feedback, involvement, and decision-making.
 - 4. **Campus Engagement**: Develop campus activities and events that foster learning regulation, promoting student involvement in community service and clubs.
- Suggestions for Future Research
 - 1. **Explore Additional Variables**: Investigate students' attitudes, attribution, and competencies impacting academic motivation.

- 2. **Examine Social Factors**: Study the influence of learning environments, teaching methods, and peer interactions on motivation.
- 3. **Prediction Methods**: Further research is needed to explore the predictive role of in academic motivation.
- 4. **Randomized Sampling**: Replicate the study using randomized samples for better validation of results.
- 5. **Include More MSLQ Subscales**: Future studies should incorporate additional subscales like help-seeking and peer learning.
- 6. **Mixed-Methods Approach**: A combination of quantitative and qualitative methods will deepen understanding of academic motivation.
- 7. **Focus on Male Students**: Investigate the hypothesized model specifically among male undergraduates to enhance generalizability.
- 8. **Diverse Ethnic Groups**: Further research should include a wider range of ethnic backgrounds to assess cultural differences in motivation.

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