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Research Article

Mediating effect of psychological needs satisfaction on the relationship between gratitude and academic motivation during online learning

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As lack of interaction has been cited as a central reason for reduced academic motivation during online learning and given gratitude's crucial role in forming and maintaining interpersonal relationships, this study examined the association between gratitude and academic motivation. Recent systematic reviews and meta-analyses have found psychological needs satisfaction to be related to autonomous motivation and indicators of well-being. As such, this study also examined the mediating role of psychological needs satisfaction on the relationship between gratitude and academic motivation during online learning among undergraduates in Malaysia. Two hundred and fifty students who are pursuing their tertiary education in private universities across the country filled in an online survey. Results revealed that there is a significant positive relationship between gratitude and autonomous academic motivation and a significant negative relationship between gratitude and academic amotivation. Gratitude, however, is not significantly associated with controlled academic motivation. Further, it was found that psychological needs satisfaction significantly mediates the relationships between gratitude and autonomous academic motivation as well as gratitude and academic amotivation. Psychological needs satisfaction, however, does not significantly mediate the relationship between gratitude and controlled academic motivation. These findings provide insights into addressing the problem of declining academic motivation during online learning.

Keywords: Gratitude; Autonomy; Competence; Relatedness; Motivation; Higher education

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1. Introduction

An increase in the number of online learning programs is witnessed around the world due to the benefits it brings to students, teaching faculty, as well as educational institutions (Cleary, 2021). The increase was further accelerated by the recent COVID-19 pandemic and this trend is expected to persist for years to come (Kim & Gurvitch, 2020). Online learning provides flexible access to education. That is, it allows students to pursue tertiary education despite not being able to take full-time, on-campus programs due to reasons such as employment, travel cost, and caretaking

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responsibilities. Online learning also offers greater flexibility to instructors and educational institutions an opportunity to expand enrolments to nontraditional students.

Experts emphasize that the escalation in online learning programs has created a parallel attrition problem at the tertiary educational level across the world. One of the primary reasons recorded for the attrition problem is declining academic motivation (Cleary, 2021; Colferai & Gregory, 2015). Academic motivation refers to the cause of behaviors that are associated with academic functioning and success (Schunk et al., 2008). Consistent with Deci et al.'s (1991) theorization, Vallerand et al. (1992) proposed that academic behaviors can be intrinsically motivated, extrinsically motivated, or amotivated. Extrinsic motivation constitutes external regulation, introjected regulation, identified regulation, and integrated regulation. Deci and Ryan (2000) conceptualized motivation to be varying on a self-determination continuum and proposed three alternative types of motivation namely, autonomous motivation, controlled motivation, and amotivation. Autonomous motivation refers to the cause of behaviors that are self-determined, with a full sense of volition and choice. Both intrinsic motivation, and identified and integrated regulations of external motivation make up autonomous motivation. Controlled motivation refers to the cause of behaviors that are non-self-determined, that is, with a sense of pressure to perform an action. External and introjected regulations of extrinsic motivation form controlled motivation. Finally, amotivation refers to a state of lack of intention to act.

Given the importance of academic motivation in human learning and development (Rowell & Hong, 2013), it is vital to better understand the predictors of superior academic motivation. As lack of interaction has been frequently cited as the reason for decreased academic motivation during online learning (Allam et al., 2020; Chung et al., 2020), gratitude, conceptualized as a life orientation towards noticing and appreciating the positive in the world (Wood et al., 2010), is a crucial factor to study in understanding academic motivation. Gratitude plays a vital role in forming and maintaining important interpersonal relationships (Algoe, 2012) and has been shown to predict academic motivation (King & Datu, 2018; Nawa & Yamagishi, 2021).

Although the association between gratitude and academic motivation has been proposed in existing literature, a fair amount of the relevant studies have conceptualized gratitude as an emotion only (Wood et al., 2010). Studies examining gratitude as a life orientation towards appreciating the positive in the world generally, beyond a grateful emotion felt in reaction to others' help, are still uncommon. Additionally, while gratitude has been shown to promote greater use of coping strategies in the face of life challenges (Lau & Cheng, 2017), studies exploring its role in the academic motivation of students faced by a global pandemic are relatively scarce. Further, even though the association between gratitude and academic motivation has been suggested in the literature, the studies investigating the explanatory mechanisms of this relationship are limited.

Psychological needs satisfaction, defined as the fulfillment of autonomy, competence, and relatedness needs (Deci & Ryan, 2000), was established to be related to autonomous motivation and indicators of well-being in recent systematic reviews and meta-analyses (Tang et al., 2019; Vasconcellos et al., 2020). Studies investigating the alluded mediating role of psychological needs satisfaction on the relationship between gratitude and academic motivation, particularly in collectivistic cultures, remain sparse. Thus, this study is an attempt to investigate the mediating role of psychological needs satisfaction on the relationship between gratitude and academic motivation during online learning among undergraduates in Malaysia.

2. Review of Past Studies

2.1. Association between Gratitude and Academic Motivation

Howells (2004) conducted case studies on the role of gratitude in higher education and reported that gratitude enhances motivation. Similarly, King and Datu (2018) conducted a series of studies to investigate the link between gratitude and academic motivation. First, using a cross-sectional study, they examined over 460 university students from a public university in the Philippines. Data gathered via self-reports revealed that gratitude is positively associated with autonomous

academic motivation. They further conducted a longitudinal study with over 400 Filipino public high school students and found that gratitude is concurrently and prospectively associated with autonomous academic motivation. While insightful, it is crucial to note that the samples were taken from public educational institutions only, necessitating further studies among students from private institutions. In addition, Mofidi et al. (2014) administered questionnaires to over 50 university students and found an association between gratitude and student persistence. Although related, the researchers did not explicitly examine academic motivation. It is also crucial to investigate other types of academic motivation, specifically academic amotivation, which was well-studied by Nawa and Yamagishi (2021) and Valdez et al. (2022).

Nawa and Yamagishi (2021) conducted an experimental study utilizing over 80 students from Japan and found the participants in the experimental group, who engaged in a gratitude journal task, to report enhanced academic motivation than their control group counterparts. The researchers further reported that the enhancement was driven by the decrease in the levels of academic amotivation. Valdez et al. (2022) employed a mixed-method study to examine the effect of Facebook-based gratitude intervention on academic motivation among 110 Filipino high school students. The quantitative results revealed that participants in the gratitude intervention experimental group have higher levels of autonomous and controlled academic motivation than participants in the control group. Experimental studies discussed above however primarily examined state gratitude and it is important to examine trait or dispositional gratitude as well. Also, a fair number of the studies discussed above utilized high school students as the sample, confirming the observation that research on gratitude within higher education is still relatively scarce (Cownie, 2017).

2.2. Association between Gratitude and Psychological Needs Satisfaction

A correlational survey study involving about 470 students from three public universities in Türkiye found that gratitude enhances the satisfaction of psychological needs for autonomy, competence, and relatedness (Kardas & Yalcin, 2021). The authors further claimed that the enhancement is facilitated by students' perceived social support. Self-report data gathered from over 240 students of a North American private university also revealed a positive association between gratitude and psychological needs satisfaction (Tsang et al., 2014). Relatedly, Lee et al. (2015) conducted a longitudinal survey study with a sample of 235 undergraduates from Singapore. They found that gratitude predicted autonomy and relatedness needs satisfaction over time, but not competence needs satisfaction. However, as gratitude has been shown to predict competence needs satisfaction in other empirical studies such as Kardas and Yalcin (2021) and Tsang et al. (2014), it is essential to explore this line of inquiry further.

In addition, questionnaire responses from over 680 Chinese high school students revealed that gratitude is positively related to psychological needs satisfaction (Jin & Wang, 2019). Likewise, Reyes et al. (2022) reported that gratitude increases satisfaction and reduces the frustration of psychological needs, based on a longitudinal survey study involving over 600 South American (Chilean) adults, aged 21 to 72 years old. While both Jin and Wang (2019) and Reyes et al. (2022) discovered significant findings, the former sample consisted of high school students only and the latter consisted of the general adult population. As the link between gratitude and psychological needs satisfaction may manifest differently in a university student population compared to high school students or general adult population, further exploration of the link among university students is warranted.

2.3. Association between Psychological Needs Satisfaction and Academic Motivation

A study involving over 2000 Chinese participants by Ma et al.'s (2016) recorded a positive association between psychological needs satisfaction and motivation. Liu and Chung's (2016) study involving a similar sample of over 460 Chinese university students found that psychological needs satisfaction, specifically, autonomy and competence but not relatedness needs satisfaction, is associated with students' intrinsic motivation. In contrast, Trenshaw et al. (2016) reported that

relatedness needs satisfaction plays a more important role in students' intrinsic motivation, based on interview responses from 17 university students from North America. The difference in findings between Liu and Chung (2016) and Trenshaw et al. (2016), particularly in relation to relatedness needs satisfaction, indicates a potential cultural difference in the way psychological needs satisfaction operates. Researchers have also found a direct and positive effect of psychological needs satisfaction on intrinsic motivation among 365 public university students in western Iran (Karimi & Sotoodeh, 2020). Similarly, a study involving over 370 Massive Open Online Courses students found that psychological needs satisfaction has a significant positive effect on intrinsic motivation (Sun et al., 2019). However, most studies discussed above did not consider other types of autonomous academic motivation, that is, identified and integrated regulations of external motivation.

In addition, Levpušček and Podlesek (2019) employed a correlational study among over 120 Slovenian university students, and found that amotivation is negatively related to psychological needs satisfaction, particularly, autonomy and competence needs. A cross-sectional correlational study with a sample of over 920 students from South America also revealed a positive relation between psychological needs satisfaction and autonomous motivation (Orsini et al., 2018). Recent systematic reviews and meta-analyses further established a strong positive association between psychological needs satisfaction and autonomous motivation, and a moderate negative association between the former and amotivation (Tang et al., 2019; Vasconcellos et al., 2020). Notwithstanding the insightfulness of the abovementioned findings, scholars like Wu et al. (2014) and Zhou et al. (2019) have argued that such findings from Western cultures may not generalize to Eastern cultures as the former is individualistic and emphasizes the self while the latter is more collectivistic and stresses social obligations.

3. Current Study

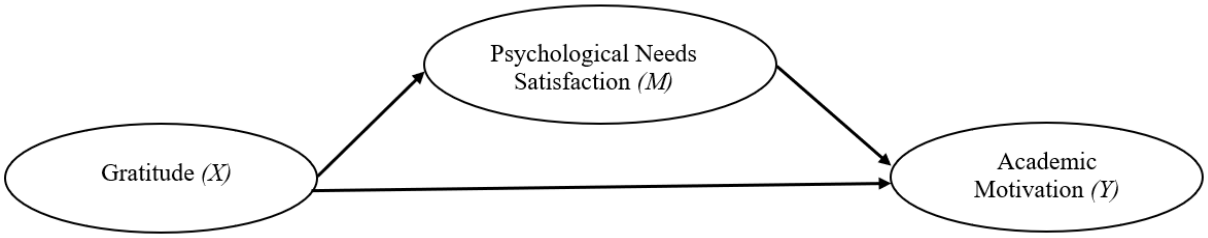
The current study aims to examine the association between gratitude and academic motivation as well as the mediating role of psychological needs satisfaction on the relationship between gratitude and academic motivation during online learning among undergraduates in Malaysia. Specifically, this study aimed to answer the following research questions.

RQ 1) Is there a significant relationship between (i) gratitude and autonomous academic motivation, (ii) gratitude and controlled academic motivation, and (iii) gratitude and academic amotivation?

RQ 2) Does psychological needs satisfaction significantly mediate the relationship between (i) gratitude and autonomous academic motivation, (ii) gratitude and controlled academic motivation, and (iii) gratitude and academic amotivation?

Academic motivation is the criterion variable of the study (Y) with three components namely autonomous academic motivation, controlled academic motivation, and academic amotivation. Gratitude is the predictor variable of the study (X) while psychological needs satisfaction is the mediator (M) in the study model. Figure 1 depicts the a priori model of the study.

Figure 1
A Priori Model of the Study



It was hypothesized that there are significant relationships between (i) gratitude and autonomous academic motivation, (ii) gratitude and controlled academic motivation, and (iii)

gratitude and academic amotivation. Further, it was hypothesized that psychological needs satisfaction mediates the relationships between (i) gratitude and autonomous academic motivation, (ii) gratitude and controlled academic motivation, and (iii) gratitude and academic amotivation. Consistent with Fredrickson's (1998, 2001, 2004) Broaden-and-Build Theory, gratitude expands students' personal and social resources. Consistent with Deci and Ryan's (2000, 2017) Basic Psychological Needs Theory, these resources then promote greater psychological needs satisfaction, specifically by creating a sense of competence and belonging. Ultimately, consistent with Deci and Ryan's (2000, 2017) Self-Determination Theory and Basic Psychological Needs Theory, psychological needs satisfaction, in turn, promotes academic motivation. Specifically, psychological needs satisfaction enhances interest and enjoyment of academic tasks, which results in higher motivation. Psychological needs satisfaction also boosts internalization (transforming regulation into regulation by internal processes), which is the essential element of identified and integrated regulations of external motivation. Collectively, interest, enjoyment, and internalization that result from psychological needs satisfaction enable academic motivation.

4. Method

A correlational research design was employed in this study and the study data were collected using a cross-sectional online survey. An online survey was utilized for its relative strengths including speed and timeliness, ease of data entry and analysis, question diversity, low administration cost, ease of obtaining large sample, control of answer order, and required completion of answers (Evans & Mathur, 2018).

4.1. Participants

Three hundred eighty-eight students who are pursuing their tertiary education in private universities across the country were recruited via convenience sampling for this study. Specifically, the first author contacted the university academic or administrative staff via email, requesting them to forward the online survey link to their respective students. The first author also shared the online survey link on social media platforms including Facebook and LinkedIn to reach potential participants. Although there are concerns with generalizability due to the non-probabilistic nature of convenience sampling, ensuring the representativeness of the sample would still yield a valid sample in resource-limited contexts (Zhao, 2020). This was achieved by recruiting participants from a range of private universities in the current study. The final data analysis involved 250 participants only as responses from 138 of the participants were deemed invalid as they did not fulfill the participation criteria of being an undergraduate and/or failed to answer one or more of the three attention check questions correctly. The final sample consisted of 174 (69.6%) women and 76 (30.4%) men participants with a mean age of 30.52 years old (SD = 9.07). 42.4% of participants identified as Malay, 21.6% as Indian, 20.0% as Chinese, another 13.6% as Bumiputera Sabah/Sarawak, and the remaining 2.4% identified as members of other ethnic groups. 99.6% of the participants were Malaysian students, with only one international student. 13.6% of the participants self-reported having low socioeconomic status, 69.6% in the middle, and 16.8% having high socioeconomic status. 34.8% of the participants were majoring in business, 16.0% in education, 13.6% in psychology, 10.4% in sciences (e.g., chemistry, biology), 6.8% in health sciences (e.g., medicine, nursing), 6.0% in human resources, 4.0% in liberal arts, 2.8% in information technology, 2.4% in computer science, and the remaining 3.2% in other majors. 29.2% of participants were in the first year of study, 30.8% in the second year of study, and 40.0% in the third year of study and above.

4.2. Measures

Gratitude was measured using the Gratitude Questionnaire-Six-Item Form (McCullough et al., 2002). The GQ-6 is a six-item self-report measure that aims to capture individual differences in the disposition to experience gratitude in daily life. The GQ-6 is one of the most commonly used measures of gratitude today (Renshaw & Olinger-Steeves, 2016). Academic motivation was

measured using the Academic Motivation Scale (AMS; Vallerand et al., 1992). The AMS is a 28-item self-report measure that aims to capture the reasons as to why a student goes to university. Autonomous academic motivation is captured by intrinsic motivation to know, intrinsic motivation toward accomplishment, intrinsic motivation to experience stimulation, and extrinsic identified regulation subscales. Controlled academic motivation is captured by extrinsic external regulation and extrinsic introjected regulation subscales while amotivation is assessed by the amotivation subscale. The AMS is one of the most widely used measures of academic motivation across the world with validation in culturally diverse nations including the United States, Türkiye, China, Philippines, Jordan, Indonesia, and Singapore (Alghariabeh, 2021). Psychological needs satisfaction was measured using the Basic Psychological Need Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2014). The BPNSFS is a 24-item self-report measure that assesses the satisfaction and frustration of the psychological needs for autonomy, competence, and relatedness. In the current study, the items were adapted for an online learning context, primarily by adding the phrase "in this online course" to all items, similar to studies such as Wang et al. (2019) and Müller et al. (2021). The BPNSFS is one of the most widely used measures of psychological needs satisfaction today (Vansteenkiste et al., 2020).

4.3. Procedure

The online survey of the current study was shared using Google Forms web application. Participants were first presented with an information letter and informed consent form. Participants who gave their consent were requested to choose and state one academic course that they were doing fully online, that is, attending lectures or tutorials and completing assessments online, in the current academic semester to reflect on or think about for the next questionnaire. Participants were then requested to fill in a series of questionnaires measuring the variables of the study namely the Gratitude Questionnaire-Six-Item Form, Basic Psychological Need Satisfaction and Frustration Scale, and Academic Motivation Scale. Attention check questions were inserted in between the items for Basic Psychological Need Satisfaction and Frustration Scale, and Academic Motivation Scale. Attention check questions have been suggested as one of the key ways to identify inattentive respondents and improve the quality of data (Pei et al., 2020). Finally, participants were required to fill in the demographic information form, which contains items on age, gender, ethnicity, nationality, socioeconomic status, name of university, academic major, and year of study. The current research project was sent for institutional review and approval before the commencement of the study.

5. Results

Table 1 shows the internal consistencies, means, and standard deviations of gratitude, academic motivation, and psychological needs satisfaction, as well as the bivariate correlations between the variables.

Table 1
Internal Consistencies, Means, Standard Deviations, and Bivariate Correlations

Variable	*a*	*M*	*SD*	1	2	3	4	5
1. Gratitude	.73	5.61	0.87	–				
2. Autonomous Academic Motivation	.87	5.88	0.79	.32*	–			
3. Controlled Academic Motivation	.83	5.74	1.03	.05	.58*	–		
4. Academic Amotivation	.80	2.05	1.25	−.52*	−.25*	−.07	–	
5. Psychological Needs Satisfaction	.93	3.91	0.73	.38*	.42*	.12	−.46*	–

Note. * = This is statistically significant at $p < .05$.

5.1. Relationship between Presence and Academic Motivation

Pearson's *r* with bootstrapping (with 5000 samples) revealed that there is a significant positive relationship between gratitude and autonomous academic motivation, $r(248) = .32$, $p < .001$, 95% CI [.18, .45]. Results revealed that there is no significant relationship between gratitude and controlled

academic motivation, $r(248) = .05$, $p = .470$, 95% CI [−.09, .18]. Further, it was found that there is a significant negative relationship between gratitude and academic amotivation, $r(248) = -.52$, $p < .001$, 95% CI [−.61, −.42].

5.2. Psychological Needs Satisfaction as Mediator on the Relationship between Presence and Academic Motivation

Table 2 shows the mediation analyses for psychological needs satisfaction as a mediator on the relationship between gratitude and autonomous academic motivation.

Table 2
Mediation Analyses for Psychological Needs Satisfaction as Mediator on the Relationship between Gratitude and Autonomous Academic Motivation

Variable	*B*	*SE*	*95% CI*		*p*
			LL	*UL*	
Model 1: Psychological Needs Satisfaction					
Gratitude	0.30	0.05	0.21	0.40	< .001
Model 2: Autonomous Academic Motivation					
Gratitude	0.17	0.06	0.06	0.28	.002
Psychological Needs Satisfaction	0.39	0.07	0.26	0.53	< .001
Model 3: Autonomous Academic Motivation					
Gratitude	0.29	0.05	0.18	0.40	< .001

Note. *B* = unstandardized Beta coefficient; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit.

Table 3 shows the mediation analyses for psychological needs satisfaction as a mediator on the relationship between gratitude and controlled academic motivation.

Table 3
Mediation Analyses for Psychological Needs Satisfaction as Mediator on the Relationship between Gratitude and Controlled Academic Motivation

Variable	*B*	*SE*	*95% CI*		*p*
			LL	*UL*	
Model 1: Psychological Needs Satisfaction					
Gratitude	0.30	0.05	0.21	0.40	< .001
Model 2: Autonomous Academic Motivation					
Gratitude	0.004	0.08	−0.16	0.16	.963
Psychological Needs Satisfaction	0.17	0.10	−0.03	0.37	.096
Model 3: Autonomous Academic Motivation					
Gratitude	0.05	0.08	−0.09	0.20	.470

Note. *B* = unstandardized Beta coefficient; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit.

Table 4 shows the mediation analyses for psychological needs satisfaction as a mediator on the relationship between gratitude and academic amotivation.

Table 4
Mediation Analyses for Psychological Needs Satisfaction as Mediator on the Relationship between Gratitude and Academic Amotivation

Variable	*B*	*SE*	*95% CI*		*p*
			LL	*UL*	
Model 1: Psychological Needs Satisfaction					
Gratitude	0.30	0.05	0.21	0.40	< .001
Model 2: Academic Amotivation					
Gratitude	−0.58	0.08	−0.74	−0.43	< .001
Psychological Needs Satisfaction	−0.56	0.10	−0.75	−0.36	< .001
Model 3: Academic Amotivation					
Gratitude	−0.75	0.08	−0.91	−0.60	< .001

Note. *B* = unstandardized Beta coefficient; *CI* = confidence interval; *LL* = lower limit; *UL* = upper limit.

PROCESS macro for SPSS (Model 4; Preacher & Hayes, 2004, 2008) with bootstrapping (with 5000 samples) revealed that the total effect model with gratitude as the predictor of autonomous academic motivation was significant, $F(1, 248) = 27.95$, $p < .001$, $R^2 = .10$. Gratitude significantly predicted autonomous academic motivation, $b_c = 0.29$, $t(248) = 5.29$, $p < .001$. The model with gratitude as the predictor of psychological needs satisfaction was significant, $F(1, 248) = 40.65$, $p < .001$, $R^2 = .14$. Gratitude significantly and positively predicted psychological needs satisfaction, $b = 0.30$, $t(248) = 6.38$, $p < .001$. The overall mediation model with gratitude and psychological needs satisfaction as the predictors of autonomous academic motivation was significant, $F(2, 247) = 31.82$, $p < .001$, $R^2 = .20$. Psychological needs satisfaction was significantly and positively predictive of autonomous academic motivation while controlling for gratitude, $b_b = 0.39$, $t(248) = 5.67$, $p < .001$. Gratitude was still a significant predictor of autonomous academic motivation while controlling for psychological needs satisfaction, but to a lesser degree, $b_{c'} = 0.17$, $t(248) = 3.07$, $= .002$. Further, there was a significant indirect effect of gratitude on autonomous academic motivation through psychological needs satisfaction, $b = 0.12$, BCa CI [0.06, 0.19].

Additionally, results revealed that the total effect model with gratitude as the predictor of controlled academic motivation was not significant, $F(1, 248) = 0.52$, $p = .470$, $R^2 = .002$. Gratitude did not significantly predict controlled academic motivation, $b_c = 0.05$, $t(248) = 0.72$, $p = .470$. The model with gratitude as the predictor of psychological needs satisfaction was significant, $F(1, 248) = 40.65$, $p < .001$, $R^2 = .14$. Gratitude significantly and positively predicted psychological needs satisfaction, $b = 0.30$, $t(248) = 6.38$, $p < .001$. The overall mediation model with gratitude and psychological needs satisfaction as the predictors of controlled academic motivation was not significant, $F(2, 247) = 1.66$, $p = .193$, $R^2 = .01$. Psychological needs satisfaction was not a significant predictor of controlled academic motivation while controlling for gratitude, $b_b = 0.17$, $t(248) = 1.67$, $p = .096$. Gratitude was not a significant predictor of controlled academic motivation while controlling for psychological needs satisfaction, $b_{c'} = 0.004$, $t(248) = 0.05$, $p = .963$. Further, there was no significant indirect effect of gratitude on controlled academic motivation through psychological needs satisfaction, $b = 0.05$, BCa CI [−0.02, 0.13].

Further, it was found that the total effect model with gratitude as the predictor of academic amotivation was significant, $F(1, 248) = 92.61$, $p < .001$, $R^2 = .27$. Gratitude significantly predicted academic amotivation, $b_c = -0.75$, $t(248) = -9.62$, $p < .001$. The model with gratitude as the predictor of psychological needs satisfaction was significant, $F(1, 248) = 40.65$, $p < .001$, $R^2 = .14$. Gratitude significantly and positively predicted psychological needs satisfaction, $b = 0.30$, $t(248) = 6.38$, $p < .001$. The overall mediation model with gratitude and psychological needs satisfaction as the predictors of academic amotivation was significant, $F(2, 247) = 68.11$, $p < .001$, $R^2 = .36$. Psychological needs satisfaction was significantly and negatively predictive of academic amotivation while controlling for gratitude, $b_b = -0.56$, $t(248) = -5.66$, $p < .001$. Gratitude was still a significant predictor of academic amotivation while controlling for psychological needs satisfaction, but to a lesser degree, $b_{c'} = -0.58$, $t(248) = -7.34$, $p < .001$. Further, there was a significant indirect effect of gratitude on academic amotivation through psychological needs satisfaction, $b = -0.17$, BCa CI [−0.28, −0.08].

A summary of all mediating effects of the current study is presented in Table 5.

Table 5
Summary of Mediating Effects

Mediation Path			*95% CI*	
	Indirect Effect Estimation	*SE*	*LL*	*UL*
G → PNS → AAM	0.12	0.03	0.06	0.19
G → PNS → CAM	0.05	0.04	−0.02	0.13
G → PNS → AA	−0.17	0.05	−0.28	−0.08

Note. G = Gratitude; PNS = Psychological Needs Satisfaction; AAM = Autonomous Academic Motivation; CAM = Controlled Academic Motivation; AA = Academic Amotivation; CI = confidence interval; LL = lower limit; UL = upper limit.

6. Discussion

It was hypothesized that there are significant relationships between (i) gratitude and autonomous academic motivation, (ii) gratitude and controlled academic motivation, and (iii) gratitude and academic amotivation. The results of the current study revealed that there are significant relationships between gratitude and autonomous academic motivation, and gratitude and academic amotivation, but not between gratitude and controlled academic motivation. The findings are consistent with past studies including Howells (2004) and King and Datu (2018) that established an association between gratitude and academic motivation, particularly autonomous academic motivation. The findings are also consistent with Nawa and Yamagishi's (2021) study that recorded that gratitude intervention reduces the level of academic amotivation. The current study findings, however, are not consistent with Valdez et al. (2022), which found that gratitude intervention increases both autonomous academic motivation and controlled academic motivation. As gratitude expands students' personal and social resources, a higher level of gratitude aids to increase self-determined behaviors that are essential to autonomous academic motivation. Inversely, with the expansion of resources facilitated by gratitude, academic amotivation decreases. As controlled academic motivation relates more to behaviors that are performed due to some form of pressure from external sources, it is not altered by resources provided by acts of noticing and appreciating the positive in the world seen in gratitude. Further, Valdez et al.'s (2022) study above focused on state gratitude in contrast to trait gratitude measured in the current study. It is plausible that controlled academic motivation is related to the immediate emotional reaction to other individuals' benevolence, but the association does not hold when gratitude is conceptualized and measured as a long-term life orientation.

It was hypothesized that psychological needs satisfaction significantly mediates the relationships between (i) gratitude and autonomous academic motivation, (ii) gratitude and controlled academic motivation, and (iii) gratitude and academic amotivation. The results of the current study revealed that psychological needs satisfaction significantly mediates the relationship between gratitude and autonomous academic motivation and the relationship between gratitude and academic amotivation, but not the relationship between gratitude and controlled academic motivation. These results are mostly consistent with past studies including Jin and Wang (2019), Kardas and Yalcin (2021), and Reyes et al. (2022) that discovered that gratitude is positively related to psychological needs satisfaction. Gratitude expands students' personal and social resources, which in turn, promotes greater psychological needs satisfaction, specifically by creating a sense of competence and belonging. As discussed above, psychological needs satisfaction enhances interest and enjoyment of academic tasks as well as boosts internalization, which results in an increased level of autonomous academic motivation and a decreased level of academic amotivation. As controlled academic motivation pertains to behaviors that are non-self-determined or with a sense of pressure to perform an action, it is not greatly influenced by psychological needs satisfaction that captures one's sense of connection with others (relatedness) and efficacy (competence).

6.1. Limitations of the Study

While this study shed light on the mediation effect of psychological needs satisfaction on the relationship between gratitude and academic motivation of undergraduates during online learning, it has some limitations. Firstly, due to the correlational nature of the study, it is not possible to establish cause and effect between study variables. Further, convenience sampling employed in the current study limited the control of individual factors such as students' ethnicity, socioeconomic status, and academic major. This limits the generalizability of the study findings to all undergraduates in Malaysia and beyond as there could be systematic variations between students of different sociodemographic backgrounds. In addition, the objectivity of self-reported data may have been compromised by participants' social desirability bias. The cross-sectional design of the current study did not capture the long-term changes in academic motivation and its predictor as well.

6.2. Recommendations from the Study

University administrations should invest in interventions that promote gratitude in students, to enhance students' academic motivation, particularly autonomous academic motivation, and to reduce academic amotivation. That is, students should be guided to develop a life orientation of noticing and appreciating the positive in the world. Nawa and Yamagishi's (2021) gratitude journal intervention referenced earlier in the paper is an example of such intervention that university administrations may model after. The university administrations can also administer the Gratitude Questionnaire - Six Item Form before and after the interventions to assess the effectiveness of the interventions. In addition, university administrations should pay more attention to students' psychological needs satisfaction to enhance academic motivation. Avenues to promote students' psychological needs satisfaction, that is, fulfillment of autonomy, competence, and relatedness needs, during online learning need to be created or enhanced. Particularly, students need to have opportunities for the fulfillment of the need for freedom to self-organize and make choices, that are consistent with their integrated sense of self. Students should also be supported to have an impact on their environment and achieve valued outcomes in it. Students should also have opportunities for genuine connection, and mutual love and care. Administrations may also utilize the Basic Psychological Need Satisfaction and Frustration Scale to periodically assess students' level of psychological needs satisfaction and intervene as needed.

6.3. Recommendations for Future Research

Future researchers may investigate the moderating role of the sociodemographic variables including age, gender, ethnicity, socioeconomic status, academic major, and year of study, on the relationships between gratitude, psychological needs satisfaction, and academic motivation. Cross-cultural and cross-national comparison studies can be employed as well. Further, a longitudinal study can be utilized to better capture the long-term changes in study variables, particularly, students' academic motivation. For instance, collecting data for gratitude at Time 1, psychological needs satisfaction at Time 2, and academic motivation at Time 3, with a gap of at least two weeks in between the measurements, would be valuable. Finally, future researchers may employ a mixed-methods research to better capture students' lived experiences during online learning, especially in regards to gratitude, psychological needs satisfaction, and academic motivation, in addition to the numerical values that are gathered with the current quantitative methodology.

7. Conclusion

As lack of interaction has been cited as a central reason for reduced academic motivation in online learning and given gratitude's crucial role in forming and maintaining interpersonal relationships, this study investigated the association between gratitude and academic motivation. Recent systematic reviews and meta-analyses have discovered psychological needs satisfaction to be associated with autonomous motivation and indicators of well-being. As such, this study examined the mediating role of psychological needs satisfaction on the relationship between gratitude and academic motivation during online learning among undergraduates in Malaysia. The results of the study revealed that there are significant relationships between gratitude and autonomous academic motivation, and gratitude and academic amotivation, but not between gratitude and controlled academic motivation. Furthermore, the results of the study suggested that psychological needs satisfaction significantly mediates the relationship between gratitude and autonomous academic motivation and the relationship between gratitude and academic amotivation, but not the relationship between gratitude and controlled academic motivation. The current research has helped in addressing the gap in the literature on explanatory mechanisms of the relationship between gratitude and academic motivation. It is hoped that the recommendations from the study and recommendations for future research presented above are critically reflected and acted upon by all relevant parties including academic researchers, university instructors, and

university administrations, with the ultimate goal of enhancing students' academic motivation during online learning and ensuring their academic success.

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