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EDITED BY

Luis Felipe Dias Lopes,
Federal University of Santa Maria, Brazil

REVIEWED BY

M. Arli Rusandi,
Riau University, Indonesia
Kathryn Oleson,
Reed College, United States

*CORRESPONDENCE

Renzo Felipe Carranza Esteban
✉ rcarranza@usil.edu.pe

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Emotional exhaustion, academic self-efficacy, and academic procrastination as predictors of research motivation

Renzo Felipe Carranza Esteban^{1*}, Oscar Mamani-Benito²,
Ronald Castillo-Blanco³, Ana Elguera Pajares¹ and
Susana K. Lingan¹

¹Grupo de Investigación Avances en Investigación Psicológica, Facultad de Ciencias de la Salud, Universidad San Ignacio de Loyola, Lima, Perú, ²Facultad de Ciencias de la Salud, Universidad Señor de Sipán, Chiclayo, Peru, ³Facultad de Ciencias de la Salud, Carrera de Psicología, Universidad Científica del Sur, Lima, Peru

Objective: To determine whether emotional exhaustion, academic self-efficacy, and academic procrastination predict research motivation in Peruvian university students.

Methods: A cross-sectional predictive design was used and 1876 university students (59.9% female and 40.1% male), whose ages varied between 17 and 34 ($M = 20.66$; $SD = 3.55$), participated. The research motivation scale (RMS), academic self-efficacy scale (ASS), academic procrastination scale (APS), and the Single Item of Academic Emotional Exhaustion (SIAEE) scale were used to measure the variables.

Results: It is evident that the proposed model had an acceptable fit $\chi^2(2) = 0.5$, $p = 0.784$, comparative fit index = 1.000, root mean square error of approximation = 0.000, standardized residual root mean square = 0.003, showing that academic self-efficacy ($\beta = 0.26$, $p < 0.001$) and academic procrastination ($\beta = -0.26$, $p < 0.001$) significantly predict research motivation, unlike emotional exhaustion, which does not predict research motivation ($\beta = 0.03$, $p = 0.232$).

Conclusion: Academic self-efficacy and academic procrastination predict research motivation while emotional exhaustion does not, as reflected in the results.

KEYWORDS

emotional exhaustion, academic self-efficacy, academic procrastination, research motivation, university students

1 Introduction

La investigación es una de las actividades most important in the university environment. Su aprendizaje y ejercicio por parte de los estudiantes puede garantizar the development of qualified human resources to boost scientific production (Mamani-Benito, 2021).

With the impact of the COVID-19 pandemic, university population has had to adaptarse a la educación virtual, quedando privados de asistir a bibliotecas y laboratorios donde puedan continuar sus investigaciones académicas pendientes (Mamani-Benito et al., 2021). Thus, given the aumento de actividades con exigencia netamente virtual, uno podría pensar que sería más feasible to cumplir con las tareas académicas y dedicar más tiempo a los trabajos de investigación, however, la literatura advierte de la presencia de factors that affected the performance of academic and research work (Lim and Javadpour, 2021; Carranza et al., 2022b).

1.1 Research motivation

Research motivation is defined as the internal state that activates, leads, and directs the interest of a student toward activities related to the exercise of scientific research, thus generating an impulse to have the determination to achieve objectives related to scientific production (Carranza et al., 2022a).

The literature reports the existence of theoretical models capable of explaining this construct; one of them is the theory of achievement motivation oriented to action and the task (Weiner, 2010; Alvarez, 2012). Based on the main assumptions, the internal state that guides a student to carry out research is interpreted to be the product of an expectation of favorability consequent to wanting to reach a particular achievement. Therefore, one is usually persistent in the compensation of pending tasks and creates initiatives in different contexts and problems. That, in this case, is the interest in research, the product of a process that orients the efforts in terms of persistence, direction, and intensity in the goals that one intends to achieve, such as publishing a scientific article or preparing a degree thesis, essential requirements in the Peruvian context (Mamani-Benito, 2015).

Following the closure of universities due to the health emergency, students were limited to continuing with their academic and research activities as they could not access learning spaces such as laboratories and libraries (Kim and Yang, 2022). Therefore, universities have provided virtual academic platforms for them to continue their academic training and receive the necessary research advice (Mamani-Benito et al., 2021). However, it needs to be clarified whether the virtual education scenario has generated greater or lesser interest in learning and applying the scientific method, and more importantly, what factors have predisposed students to exercise their pending research.

That is why the authors reflect on whether being constantly connected online without the on-site supervision of teachers could have caused them to be unsure of what they are learning, feel exhausted, and postpone their primary activities. This is shown by research on academic procrastination, self-efficacy, and emotional exhaustion (Carranza et al., 2022a,b; Turhan et al., 2022; Warshawski, 2022).

1.2 Predictors of research motivation

The literature reports factors influencing the research motivation in the university context, from basic skills, such as the

ability to search for scientific information (Veytia and Contreras, 2018), to incentives and funding to do research (Alrahlah, 2016). However, in the scenario where virtual classes predominate, the variables that predict the level of motivation to do scientific research have yet to be explored. In this sense, the authors of this paper propose to focus the discussion on academic self-efficacy, emotional exhaustion, and academic procrastination.

Academic procrastination is understood as the delay or postponement of completing academic tasks despite being aware of its results and the negative consequences (Diotaiuti et al., 2001). In the context of virtual education resulting from the closure of schools, this variable has been reported in various studies, suggesting a negative frequency of procrastinating behavior due to factors such as inefficient adaptation to the new class modality (Muarifah et al., 2022). As reviewed in several studies, this variable is related to academic performance (Burgos-Torre and Salas-Blas, 2020), creating a barrier that prevents students from overcoming the challenges presented to them at the university stage, such as completing research papers, which require great concentration and dedication (Hong et al., 2021). Although research on the relationship between academic procrastination and motivation for research is scarce, studies suggest a functional relationship. For example, in de Hailikari et al. (2021) work with Finnish undergraduates, procrastination influenced the ability to organize time and effort for academic activities, details important in accomplishing research work.

Regarding academic self-efficacy, this variable is considered a determining factor for positive experiences in the academic environment (Borzzone, 2017); Thus, it is defined as the belief that a subject has about their ability to organize and execute the actions required to handle difficult situations or that demand a challenge (Hechenleitner-Carvallo et al., 2019). Therefore, higher education has been an area of study on which self-efficacy research has focused in this scenario, where the student faces learning challenges and difficult circumstances, such as the preparation of research papers (Fook and Sidhu, 2015). In this regard, several studies reveal that the new virtual learning scenario has influenced learning beliefs and academic results (Talsma et al., 2021). Some research has evidenced the fact that academic self-efficacy is a motivating factor for achieving academic goals (Priesack and Alcock, 2015; Schöber et al., 2018; Matteucci and Soncini, 2021). Therefore, there is a basis for considering that it can regulate motivation, a component that represents an additional source of success or failure at the university stage (Trautner and Schwinger, 2020).

Finally, emotional exhaustion is understood as a decrease in energy and a feeling of physical exhaustion associated with a sense of frustration and failure as a result of experiencing situations that involve stressful elements (Li et al., 2020). In this case, the sudden change to online education challenged the students' capacity to accept virtual learning. Studies reveal that this generated negative consequences for physical, emotional and mental health, with fatigue in university students being a main indicator (Mosleh et al., 2022). In this case, university students have to deal with various demands and challenges, such as meeting academic expectations, facing the challenge of preparing research papers, and even dealing with financial pressures (Araoz, 2021). Hence, it is possible to affirm that when these demands exceed the individual's response capacity, followed by a decrease in motivation, and then by an increase in stress, high burnout can

occur (Buenadicha-Mateos et al., 2022). Therefore, being physically and emotionally tired can affect academic commitment (Fiorilli et al., 2017), an essential factor when assuming the responsibility of fulfilling tasks that involve the exercise of scientific research (Mamani-Benito and Apaza, 2019).

1.3 Justification

In Peru, since 2014, a new university law No 30220 has been implemented with emphasis on the exercise of scientific research (Ministerio de Educacion, 2014). However, this still does not guarantee the stable growth of scientific productivity, one of the causes being the low level of motivation for research, a frequent indicator in most students of different university degrees (Castro Rodríguez et al., 2018; Corrales-Reyes and Dorta-Contreras, 2019). In view of this, this research aims to provide evidence from a predictive model by taking emotional exhaustion, academic procrastination and academic self-efficacy as independent variables, which are factors that have played a major role in the adaptation to virtual education and for which there is evidence to assume a functional relationship with the motivation for research.

1.4 Research objective

In response to the research question, “Can emotional exhaustion, academic self-efficacy and academic procrastination predict the level of motivation for research in times of health crisis and virtual education?” the main objective of this study was to determine whether emotional exhaustion, academic self-efficacy and academic procrastination predict the level of motivation for research in Peruvian university students.

1.5 Hypothesis

In response to the research question: Can emotional exhaustion, academic self-efficacy and academic procrastination predict the level of motivation for research? The authors of this study propose the following study hypotheses (see Figure 1):

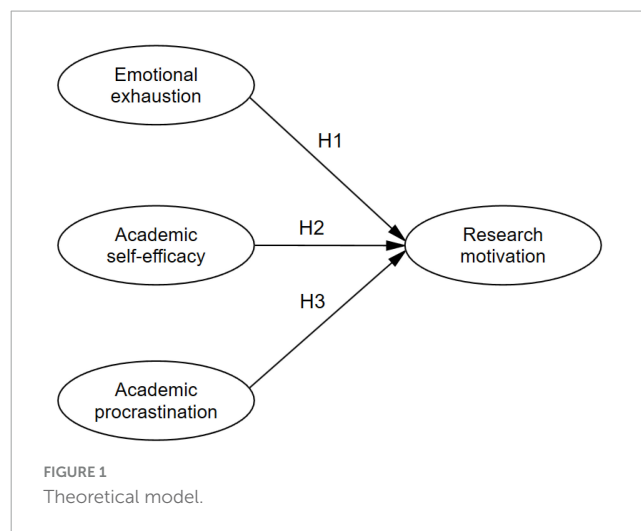
H1: The greater the emotional exhaustion, the lower the level of motivation for research.

H2: The higher the perception of academic self-efficacy, the higher the level of motivation for research.

H3: The greater the academic procrastination, the lower the level of motivation for research.

1.6 Study objective

Determining whether emotional exhaustion, academic self-efficacy, and academic procrastination predict research motivation in Peruvian university students.



2 Materials and methods

2.1 Study design

Predictive design and cross-sectional research (Ato et al., 2013).

2.2 Study participants

The participation of 1876 Peruvian university students (1112 female and 764 male), whose ages ranged from 17 to 34 ($M = 20.66$; $SD = 3.55$), and who were selected through an intentional non-probabilistic sampling.

2.3 Instruments

The Research Motivation Scale (RMS), prepared by Carranza et al. (2022a) in Peruvian university students, assesses research motivation concerning will and interest. It has 13 items, with five alternative responses on the Likert scale (never, rarely, sometimes, frequently, and always). The scale proved to be valid ($CFI = 0.959$; $RMSEA = 0.080$) and good reliability indicators were found with the data from this study.

The Single Item of Academic Emotional Exhaustion (SIAEE), designed by Dominguez-Lara and Merino-Soto (2019) in Peruvian university students, analyzes the general ways in which academic emotional exhaustion sets in. It has five response options (strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree). The scale proved to be valid ($Dm = 0.834$; Dominguez-Lara, 2013) and with the data of this study, an adequate reliability was achieved.

The Academic Procrastination Scale (APS; Dominguez-Lara et al., 2014) in Peruvian university students. Assesses procrastinatory behavior regarding the postponement of activities and academic self-regulation. It comprises 14 items on a Likert-type scale of five alternatives (Strongly disagree, disagree, neither agree nor disagree, agree, and strongly agree). The scale proved to be valid ($CFI = 1$; $RMSEA = 0.078$) and with the information from this study, adequate reliability indicators were achieved.

Perceived Self-Efficacy Specific for Academic Situations Scale (EAPESA; Dominguez-Lara, 2018) designed in Peruvian university students. It presents nine items with Likert-type response alternatives, from 1 to 4 (Never, sometimes, quite often and always). The scale proved to be valid (CFI = 0.978; RMSEA = 0.056) and with the data of this study, adequate reliability indicators were obtained.

2.4 Study procedure

The information was collected through an online questionnaire. In the first section, the objective of the study and informed consent was obtained. Likewise, it was indicated that the participation was strictly voluntary and anonymous. The research was approved by the Ethics Committee of the Universidad Peruana Unión (Reference: 2021-CEUPeU-0022).

La información se recogió mediante un cuestionario en línea. En la primera sección, se presentó el objetivo del estudio y se obtuvo el consentimiento informado. Asimismo, se indicó que la participación era estrictamente voluntaria y anónima. La investigación fue aprobada por el Comité de Ética de la Universidad Peruana Unión (Referencia: 2021-CEUPeU-0022.).

2.5 Statistical analysis

The study model was analyzed through the modeling of structural equations with the MLR estimator, which is used for numerical variables and has the property of being robust to deviations from inferential normality (Muthen and Muthen, 2017). The use of the estimator indicates the way of calculating the discrepancy function with the minimization of which the estimated parameters of the model are obtained. The fit assessment was performed using the comparative fit index (CFI), root mean square error of approximation (RMSEA), and standardized residual root mean square (SRMR). CFI values >0.90 were used (Bentler, 1990), RMSEA < 0.080, and SRMR < 0.080 (Browne and Cudeck, 1992). The above fit indices tend to be widely reported in publications in psychology (Ropovik, 2015) and an interesting review of them can be found in West et al. (2012). For the reliability analysis, the alpha internal consistency method was used (α), and for the two-dimensional procrastination instrument, stratified alpha was considered (Abad et al., 2011).

The data analysis and the calculations were implemented with the “R” software package in version 4.2.1 and the “lavaan” library was used in its version 0.6-12 (Rosseel, 2012).

3 Results

The scores of the study variables were scaled to values between 0 and 30 to facilitate their visualization with the consideration that this procedure does not affect the values of the correlations between the variables. The theoretical mean value, which is 15, thus becomes more quickly identifiable, so that mean values higher or lower than this value are quickly distinguished. Table 1 shows descriptive results, such as asymmetry (A) and the correlation results between 0.02 and 0.57 in absolute value for the study variables. In addition, this table also shows the alpha internal consistency coefficients, found to be between the values of 0.82 and 0.92.

In the analysis of the proposed model, an adequate adjustment was obtained, $\chi^2(2) = 0.5$, $p = 0.784$, CFI = 1.000, RMSEA = 0.000, SRMR = 0.003. Thus, it is confirmed that academic self-efficacy ($\beta = 0.26$, $p < 0.001$) and academic procrastination ($\beta = -0.26$, $p < 0.001$) significantly predict research motivation, corresponding to H2 and H3, respectively. On the other hand, H1 is not confirmed as emotional exhaustion does not predict research motivation, $\beta = 0.03$, $p = 0.232$. These results can be viewed in Figure 2.

4 Discussion

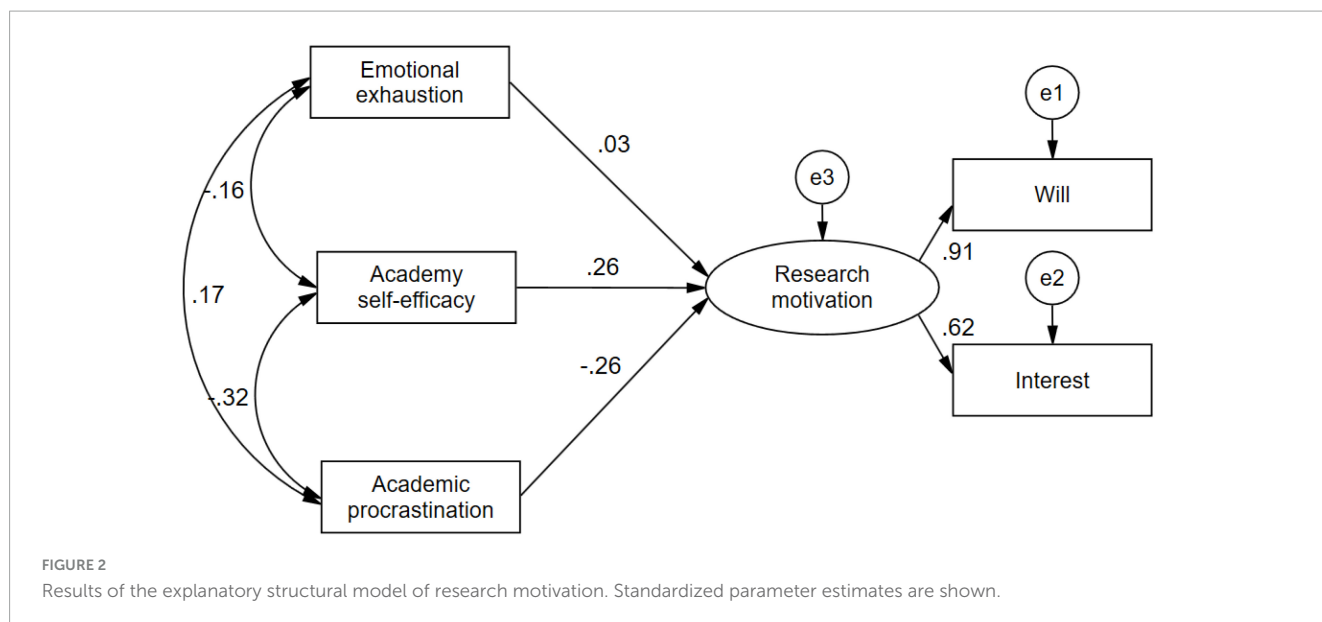
In the university context, research, as a practice and as a training process, occupies a fundamental place since it is through its knowledge that technologies are generated that must go hand in hand with the development and innovation needs of societies. Therefore, the promotion of research activities in students is one of the main tasks in the university setting, which can be manifested by their motivation toward research. In this sense, the objective of this study was to find out whether emotional exhaustion, academic self-efficacy, and academic procrastination predict the basis for research concerning Peruvian university students.

The results obtained indicate that in the study sample, academic self-efficacy and academic procrastination are significant predictors of research motivation, whereas emotional exhaustion is not. Regarding the latter, although previous works indicate that the emotional exhaustion of students can generate a decrease in motivation (Buenadicha-Mateos et al., 2022) and negatively affect academic commitment (Fiorilli et al., 2017), no research has been reported that explores the relationship between emotional exhaustion or burnout and research motivation. This may be because research on motivation for research is recent. In this scenario, it is essential for future research to deepen the study of the relationship between both variables, considering factors that may affect the said interaction. These include the educational

TABLE 1 Descriptive statistics, internal consistencies, and correlations for the study variables.

Variables	M	SD	A	α	1	2	3	4	5
1. Emotional exhaustion	19.78	7.96	-0.48	-	-				
2. Academic self-efficacy	18.58	6.22	-0.01	0.92	-0.16	-			
3. Academic procrastination	12.71	5.77	-0.28	0.87 ^a	0.17	-0.32	-		
4. Will	15.77	5.55	-0.20	0.82	-0.05	0.30	-0.31	-	
5. Interest	17.78	6.62	-0.29	0.86	-0.02	0.21	-0.21	0.57	-

^aThe value corresponds to the stratified alpha.



level or the area of training as some precedents reveal that the year of study determines differences in the intensity of perceived overload and emotional exhaustion generated in students of health-related areas (McLuckie et al., 2018; Kilic et al., 2021).

On the other hand, it is confirmed that academic self-efficacy significantly and positively predicts research motivation. The results found are in line with previous studies conducted on university students confirming direct relationships between academic self-efficacy and academic motivation (Malkoç and Mutlu, 2018; Soner, 2019; Ahmadi et al., 2021). In addition, the findings are also consistent with that reported in the study by Kuo et al. (2017), who, among other results, found that self-efficacy toward research is directly related to motivation for research in a group of graduate students. Therefore, students confident in their abilities in the academic field more likely show interest and satisfaction when participating in research activities. This way, ideas about one's capacity in the university environment can also guide the direction of performance in research practices. Therefore, as Trautner and Schwinger (2020) maintain, self-efficacy can be considered an effective mechanism to regulate motivation.

In addition, it is confirmed that academic procrastination significantly and negatively predicts research motivation. Despite not having found direct precedents with which to compare the results, the findings obtained are consistent with studies that, from classical approaches such as self-determination theory, indicate that procrastination is negatively associated with both intrinsic motivation (Rakes and Dunn, 2010) and extrinsic motivation (Brownlow and Reasinger, 2000). Similarly, a study conducted with Iranian adolescents found that academic procrastination is inversely related to achievement motivation (Ebadi and Shakoorzadeh, 2015). In addition, the presented results are also consistent with the research of Akpur (2017), who found a negative relationship between academic procrastination and academic motivation in a sample of university students in Türkiye. This way, procrastination is related to the motivational

dynamics of students. Therefore, a student with a tendency to procrastinate the tasks of the academic environment will less likely demonstrate orientation toward the identification of goals and application of effort in the exercise of activities related to research.

Some limitations need to be considered when interpreting the results. First, the non-probabilistic nature of the sample selection prevents the generalization of the results to the population of Peruvian university students. However, with many participants, we hope to highlight the importance of the findings. Second, the non-segmentation of the sample by educational areas, educational management, and years of study did not make hindered efforts to delve deeper into the mechanisms that affect the interaction of the study variables. Third, the cross-sectional design used does not allow making inferences regarding the evolution of the associations of the variables through the training process. This aspect may be crucial, considering that, in the academic period, there are times of greater demand that may affect variables, such as emotional exhaustion and research motivation, including exam seasons or supporting research papers.

Based on the limitations reported, it is recommended that future research should use sampling techniques that allow the generalization of results. Moreover, future research works can test explanatory models through the execution of longitudinal designs that allow a comprehensive approach to the phenomena studied. Finally, it is recommended that further study on the relationship between emotional exhaustion and motivation for research be conducted in order to evaluate the consistency of the results found in this study. For this purpose, it is suggested to use more extensive measures that can better represent the complexity of emotional exhaustion and consider factors that may affect the interaction of both variables, such as, for example, education level or training area (McLuckie et al., 2018; Kilic et al., 2021).

Despite the limitations presented above, the correspondence between the findings and the previous literature enables us to

establish the relevance of the present study, given that knowing the variables that will enable us to predict the research motivation provides us with a better understanding of the needs in research training, resulting in valuable strategies for its continuous improvement. Consequently, educational policies and teaching practices aimed at promoting academic self-efficacy, and preventing academic procrastination can be established through the development of tutoring programs, workshops or training courses, interventions in teaching spaces, among other mechanisms. In particular, teachers could incorporate self-assessment activities with their students in order to promote reflection on their own knowledge and skills, as well as continuous monitoring of academic tasks to prevent procrastination. All this would be reflected in a greater motivation for research in university students.

Thus, it is concluded that academic self-efficacy and academic procrastination predict research motivation, while emotional exhaustion did not have a significant impact on the study sample. Among the implications that highlight the importance of this study, the relevance of the variables academic self-efficacy and procrastination stands out in aiding in understanding how the motivational dynamics involved in the development of university student research are configured. Therefore, research-training processes must consider strategies to develop confidence in the abilities of the students themselves, in addition to establishing mechanisms that reduce procrastination in the academic environment.

Data availability statement

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

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Ethics statement

The studies involving humans were approved by the Comité de Ética de la Universidad Peruana Unión. The studies were conducted in accordance with the local legislation and institutional requirements. The participants provided their written informed consent to participate in this study.

Author contributions

RC, OM-B, and RC-B conceived and designed the experiments, performed the experiments, analyzed and interpreted the data, and wrote the manuscript. SL and AE contributed reagents, materials, analysis tools, or data and wrote the manuscript. All authors contributed to the article and approved the submitted version.

Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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