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# PSYCHOLOGICAL DYNAMICS UNDERLYING ACADEMIC PERFORMANCE IN DOCTORAL STUDENTS

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## ABSTRACT

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| Aim/Purpose | To evaluate the relationship between psychological capital, academic motivation, and academic performance in doctoral students and to develop a structural equation model that elucidates the interplay among these three variables, providing a comprehensive framework to better understand the factors influencing academic outcomes at the doctoral level. |
| Background | Current research on the relationship between these variables in doctoral students is limited, with mostly independent approaches to each variable. This study seeks to overcome this research gap by exploring the intersection of these variables, providing a more holistic understanding of the motivational processes and positive psychological resources that impact the academic and personal success of doctoral students. |
| Methodology | A quantitative approach with a non-experimental design and cross-sectional and correlational scope. The sample was collected by simple random sampling; 190 doctoral students participated, 82 men and 108 women. Three online scales were applied: the University Academic Performance Scale, the Short Academic Motivation Scale (SAMS), and the Psychological Capital Scale (PsyCap Scale). The following programs were used for data processing: SPSS version 25, AMOS version 24, and R-Project, and a six-step statistical procedure detailed in the manuscript was followed for data analysis. |
| Contribution | This paper significantly advances doctoral education by addressing critical gaps and proposing valuable insights for future research. It offers a comprehensive understanding of challenges within doctoral programs, emphasizing factors like |

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| | work-study balance and student well-being. Additionally, it advocates for a shift towards a positive paradigm, focusing on well-being and academic motivation. This paper catalyzes further innovation, fostering a deeper understanding of the doctoral experience. |
| Findings | The three scales had a high internal consistency: PsyCap 0.858, AMS 0.844, and University Academic Performance 0.767. It is observed that the internal correlations with the dimensions are high. It was found that 38% of the respondents had a low level of PsyCap, 35% had a low level of academic motivation, and 36% had a high level of university academic performance. Amotivation was a singular behavior that was discussed in the study since all the responses were in the two extremes, high and low, with 0% at the medium level. It is observed that there are significant differences between males and females concerning academic motivation, and there are also significant differences between study cycles in academic motivation and performance. The occurrence of a "motivational curve" in doctoral students has been discovered. This finding shows a high motivation at the beginning of the doctoral program, an abrupt drop during the intermediate cycles, and a progressive and sustained rebound towards the final cycles, reaching the highest motivational peak at the end. It is observed that all the dimensions of the PsyCap variable are linearly positively related, with predominance in the Self-efficacy dimension (0.839); likewise, all the dimensions of the Academic Motivation variable are linearly positively related, with predominance in the Intrinsic Motivation to Know dimension (0.887). In addition, all the dimensions of the variable University Academic Performance are linearly positively related, with predominance in the dimension Contribution in academic activities (0.862). On the other hand, Introjected Regulation is positively related to the organization of teaching resources (0.198), organization of teaching resources is positively related to Self-efficacy (0.122), and Dedication to Study is negatively related to Resilience (-0.150). Some covariance errors were detected, and finally, according to the fit indicators, the estimated structural model is acceptable. |
| Recommendations for Practitioners | Practitioners should develop tailored support programs focusing on building PsyCap and academic motivation, implement early intervention strategies to counteract motivational declines, adopt gender-sensitive approaches, integrate positive psychology practices, promote collaboration among students, continuously monitor program effectiveness, and provide faculty training to create a supportive academic environment. |
| Recommendations for Researchers | Researchers should further explore the dynamic interplay between PsyCap, academic motivation, and performance longitudinally, employing mixed methods approaches to capture nuanced experiences. Additionally, investigating the effectiveness of intervention strategies targeting these variables and examining cultural and contextual influences on motivation and performance can enrich understanding and inform evidence-based practices. |
| Impact on Society | Understanding the relationship between PsyCap, academic motivation, and university academic performance in doctoral students has significant implications for society. By elucidating the factors that contribute to academic success, this research can inform the development of more effective support systems within educational institutions. Empowering doctoral students with the psychological resources and motivation needed to thrive academically not only enhances individual well-being but also fosters innovation, knowledge creation, and societal |

advancement. Ultimately, by nurturing the next generation of scholars and researchers, this work contributes to the cultivation of a more knowledgeable, resilient, and prosperous society.

Future Research

Among the limitations of the study was that the cross-sectional design restricted the possibility of establishing causal relationships since the data were collected at a single point in time. In addition, generalization of the findings should be approached with caution due to the size and composition of the sample, which was limited to doctoral students from a single country. The exclusive use of self-report scales could also have generated response and perception biases. Future research could adopt mixed approaches that integrate qualitative techniques to delve deeper into participants' meanings and experiences.

Also, the use of larger samples, including cross-country comparative studies, would allow for a more robust understanding of the relationship between psychological capital, academic motivation, and doctoral performance. Longitudinal designs would offer a better evaluation of the evolution of these variables over time. Regarding future thematic lines of research, there is a need to delve deeper into the balance between study, work, and doctoral well-being, as well as the success factors in face-to-face and virtual dynamics in the supervisor-candidate relationship and emotional management in the academic writing process. In addition, analyzing the motivational curve, characterized by a start with high motivation, an intermediate fall, and a final rebound, would allow the design of interventions to mitigate its impact on mental health and academic progress. Likewise, identifying risk and protective factors would contribute to strengthening the resilience of doctoral students.

Keywords

doctoral education, doctoral students, doctoral research, doctoral programs, doctoral dissertations, doctoral studies, PhD student, doctoral degree

## INTRODUCTION

The interplay between academic motivation, psychological capital, and university academic performance remains an underexplored area in scientific literature, particularly within the context of doctoral education. While numerous studies have examined these variables in isolation, research that integrates their interrelationships is notably scarce. Therefore, the present study seeks to fill this gap in the scientific literature by examining the relationship between these three variables in doctoral students, hoping to provide a more complete understanding of the motivational and psychological processes that influence academic success in this group of students. In this regard, one study reaffirms that psychological capital (PsyCap) has been extensively researched in the organizational context. However, limited attention has been paid to the role of PsyCap in the academic environment (Datu et al., 2018) while continuing to emphasize the need for further studies on the relationship between teacher motivation and PsyCap (Viseu et al., 2016).

In doctoral education, formative experiences and content mastery have been found to contribute to increased research self-efficacy beliefs among doctoral students (Pasupathy, 2018). In this regard, another study expands the analysis of self-efficacy in research, considering that it must be linked to the balance between work, personal life, and psychological well-being of students in the doctoral program, highlighting the positive role of mentoring to raise the eudaemonic aspects of student well-being (Haider & Dasti, 2022). This last study was vital for our research since it places the analysis of doctoral success not only on research results but also on the eudaemonic well-being of the students, which we consider to be of great importance for the doctoral students' sense of life (Ilies et al., 2005).

In a startling study of a sample of 916 PhD candidates from 144 American universities, researchers looked at the students' experiences in their programs as well as their mental health, well-being, and optimism. They also shared recommendations for ways doctoral programs can help their students, such as encouraging them, fostering social connections, and prioritizing their well-being over productivity (Syropoulos et al., 2021). We have also selected a study that highlights the role of motivation as a factor of success, with special emphasis on the implications of this "force from within" for academic self-efficacy at the doctoral level (Dortch, 2016), while another study warns that coping strategies and resilience may be a double-edged sword (Shavers & Moore, 2014). This debate is very interesting because it places a balance between the doctorate and personal life, since it would not be successful in achieving a doctoral degree at such a high cost that it negatively compromises mental and emotional health. Life does not stop, it is not put on pause for the doctorate to happen. People undertake their doctoral career along with personal, family, work, economic, social, cultural, ethical, aesthetic, and political achievements and challenges.

Thus, the doctoral career is a process that requires a lot of persistence, a construct closely related to academic motivation and psychological capital that has been addressed by several studies in the field of doctoral education (Cockrell & Shelley, 2010; Cohen, 2011; Ivankova & Stick, 2007; Kennedy et al., 2015; Massyn, 2023; Patterson-Stewart et al., 1997; Sellami et al., 2021; Terrell et al., 2012). There are even authors who examine the relationship between persistence and mental health (Shanachilubwa et al., 2023), considering that doctoral success would not be complete if the person does not achieve, together with his or her study results and doctoral degree, stable psychosocial well-being. For this reason, social support is important (Williams et al., 2019), and interpersonal strength is a critical factor contributing to persistence (Williams-Shakespeare et al., 2018).

This persistent motivation in doctoral students is shaped by cultural aspects, interdependence, and effort (Zhou, 2014). Hence, the expectancy-value theory is particularly relevant for understanding the links between motivation, persistence, and achievement (Nagle, 2021) and exploring further the positive associations between the positive side of motivation, dis-enjoyment, continuity intention, and persistence (Rodrigues et al., 2020). Academic self-efficacy and task value were recently found to have significant positive effects on persistence in learning (Lee & Song, 2022).

# LITERATURE REVIEW

## *ACADEMIC PERFORMANCE IN DOCTORAL STUDENTS*

University academic performance is a construct that has been gaining consistency in recent years (Bastidas-Chalán et al., 2023; Guevara-Otero et al., 2023; Widayanti et al., 2023; Yu et al., 2023). Specifically in the field of doctoral training, several studies have focused on academic performance as a key aspect of the student experience, examining several factors that are directly associated with this process (Guo et al., 2024; Hermana et al., 2025; Khuram et al., 2021; Wijaya et al., 2023; Yan et al., 2024).

A recent study analyzes psychological capital (PsyCap) as a moderator and burnout as a mediator in the relationship between toxic supervision and academic performance in doctoral students (Hermana et al., 2025). The findings indicate that although toxic supervision increases burnout and reduces performance, high PsyCap – self-efficacy, hope, optimism, and resilience – mitigates these negative effects, favoring adaptation and academic success. Another study on academic performance in doctoral students analyzes how various factors influence their academic performance and well-being (Yan et al., 2024). Using PLS-SEM, it was identified that teaching support, student participation, and well-being improve academic performance, while academic anxiety detracts from it. In addition, self-efficacy, parental support, and time management help reduce anxiety. The findings highlight the need to strengthen academic resources and psychological support to optimize the success of doctoral students.

In another research, it was identified that self-concept influences the academic performance of doctoral students and that this relationship is mediated by psychological factors such as academic motivation, academic resilience, and self-efficacy. A PLS-SEM analysis showed that strengthening these variables can improve academic performance, highlighting their relevance in doctoral training (Guo et al., 2024).

An investigation of mathematics education doctoral students in Indonesia, based on PLS-SEM, examined the impact of various factors on their academic performance (Wijaya et al., 2023). The results highlight that teacher support is the main predictor of performance, while student involvement improves well-being, and parental support contributes to stress reduction. These findings provide evidence of the interaction between the academic environment and emotional well-being in doctoral training.

Another paper with international doctoral students examined how academic attitude and subjective norms influence their self-perceived academic performance, considering the impact of knowledge-seeking and supervisor support (Khuram et al., 2021). The findings indicate that higher knowledge-seeking intention improves self-perceived academic performance, while strong supervisor support positively moderates this relationship. These results underscore the importance of fostering environments that encourage intellectual autonomy and access to effective supervision to optimize academic performance in doctoral programs.

Studies show that identifying factors that influence students' adjustment to university life can improve interventions aimed at improving university academic performance (Gómez Molinero et al., 2018). Inspirational motivation is a process that positively affects this performance (Muthimi et al., 2021). For this research, the specific construct of university academic performance is assumed as follows (De Lourdes Preciado-Serrano et al., 2021). The selection of this construct had three important reasons: first, it speaks of academic performance specifically in university students; second, it prioritizes the student's perspective; and third, it understands university academic performance as a process, not as a result, which is very significant because it focuses on dynamic elements of performance, which may even have an impact on other areas. Traditionally, the emphasis was placed on results such as grades, etc. These authors conceptualize the theoretical dimensions of university academic performance as (1) contribution to academic activities, (2) dedication to study, and (3) lack of organization of didactic resources.

An important study in the Ibero-American context was developed to predict the academic performance of doctoral students and found that the explanatory variables of doctoral performance are of three types: characteristics of the research groups of doctoral students, contextual variables, and attitudinal and motivational characteristics (Coromina et al., 2011). In this regard, a qualitative cross-case study of doctoral students found challenges closely related to learning outcomes, described in terms of a deeper understanding of research (quality) and of oneself as a researcher on the path to becoming a researcher (Bronkhorst & de Kleijn, 2016) which requires high levels of motivation, optimism, and resilience. More concretely, one study examined the links between motivation and academic performance, finding that the main motivation of doctoral students is to improve their theoretical knowledge and professional competence (Ju & Zhu, 2021).

The studies reviewed have identified several factors that influence the academic performance of doctoral students, including faculty support, effective supervision, self-efficacy, and resilience. Likewise, the importance of emotional well-being and stress management in academic success has been highlighted. However, the literature still presents significant gaps, especially in understanding the interaction between academic motivation, psychological capital, and academic performance. While some studies have addressed the role of self-concept and resilience in doctoral training, how these factors operate together and their relative weight in different contexts remains underexplored. In addition, although several variables affecting academic performance have been studied, there are still gaps in

the research on how motivational dynamics and psychological capital interact with the institutional and disciplinary context of doctoral students.

## *Academic Motivation in Doctoral Students*

Motivation is critical to academic success at the tertiary level (Levy & Campbell, 2008). A recent study found that students with high intrinsic motivation perform better academically (Novikova & Bychkova, 2022). In this regard, it is recognized that research on the connection between motivational processes and learning in higher education has been growing steadily (Davoglio et al., 2016), distinguishing between extrinsic and intrinsic motivation (Burgueño et al., 2017) and considering that intrinsic motivation is focused on the pleasure of the learning process and extrinsic motivation is focused on the final product (Kotera et al., 2023).

Along with a host of other cognitive and psychological outcomes necessary for thriving in a variety of sociocultural situations and contexts, motivation – the force that propels an individual to act – has been identified as a critical component in boosting overall well-being. Demotivation, extrinsic motivation (external regulation), introjection, identification, and intrinsic motivation (knowing, feeling stimulation, and attaining) are the seven components of motivation that motivation researchers have used in the Academic Motivation Scale (Caleon et al., 2015). This research assumes the concept of academic motivation, which is composed of seven theoretical dimensions: (1) intrinsic motivation toward knowledge (IMK), (2) intrinsic motivation toward achievement (IMA), (3) intrinsic motivation to experience stimuli (IMS), (4) identified regulation (IDR), (5) introjected regulation (IJR), (6) external regulation (ER), and (7) amotivation (AM) (Kotera et al., 2023).

In doctoral students, research has consistently found physical and mental health problems and high attrition rates among these students, but a comprehensive understanding of their experiences is still lacking (Sverdlik et al., 2018). Specifically, students who are more internally motivated (i.e., who engage in learning activities for reasons that are personally important and freely chosen) demonstrate better performance outcomes and are more likely to choose and persist in challenging tasks, enjoy learning, exhibit greater creativity, and generally experience greater psychological well-being (Lynch et al., 2018).

The present study considers it relevant to investigate both dispositional and situational factors that influence the motivation of doctoral students for their academic activity (Lynch et al., 2018), as well as self-determination theory (SDT), considered by many as a particularly appropriate framework to investigate the motivational process of doctoral students (De Clercq et al., 2021; Litalien & Guay, 2015; Lynch et al., 2018; van Rooij et al., 2021), and the expectations theory of value (Lee & Song, 2022; Nagle, 2021).

A previous study shows the strength of intrinsic motivation as a primary driver in the doctorate (de Jager et al., 2018). The strength of self-efficacy and optimism is also evident (Mousavi Nasab & Nezhad, 2020). This allows us to navigate toward the relevance of including psychological capital in studies related to the motivation and academic performance of doctoral students.

## *Psychological Capital in Doctoral Students*

This study assumes the theoretical construct of psychological capital that integrates the concepts of hope, optimism, resilience, and self-efficacy (Lorenz et al., 2016; Platania & Paolillo, 2022) as a protective mechanism, this time aligned to a specific context of doctoral education.

Optimistic people are more resilient in trying circumstances. Given that pursuing a doctorate is a disruptive stage that involves many stressful situations, it is critical to comprehend the role that these protective factors play in effectively managing under pressure, particularly in light of the paucity of research relating resilience to optimistic expectations for the future during the university stage (Gómez Molinero et al., 2018).

High attrition rates and widespread low emotional well-being (such as signs of anxiety or depression) are two major issues in PhD education, according to research. Yet, few therapies are specifically tailored to address these issues in the doctoral student body. Self-perception of progress has been identified lately as a critical motivating element in doctoral persistence among the structural, psychosocial, and demographic aspects influencing these issues, and more research is encouraged on the connections between progress, burnout, and dropout ideation (Prieto et al., 2022).

This is particularly significant in a context where research has consistently highlighted the multifaceted challenges that doctoral students encounter throughout their academic journey. These barriers often span personal domains, such as financial pressures or family responsibilities; professional domains, including limited career prospects and demanding work environments; academic challenges, such as rigorous program expectations and high-performance standards; and institutional factors, like bureaucratic inefficiencies or insufficient support systems. Amid these adversities, resilience emerges as a cornerstone of their psychological capital, equipping students with the mental and emotional fortitude to adapt, persevere, and thrive despite the complexities inherent in their pursuit of advanced academic and professional goals (Kokotsaki, 2023).

Intrinsic motivation is essential for sustaining the quality, level of work, and persistence required in doctoral studies. However, successful PhD completion is not solely dependent on academic commitment but also on students' psychological well-being. To ensure doctoral persistence, researchers must consider the impact of mental health on the educational process, providing the necessary support to manage academic and emotional challenges. In this regard, effective supervision should facilitate the fulfillment of three fundamental psychological needs: autonomy, which enables students to develop their research approach; competence, which strengthens their confidence in academic and research skills; and motivational relationships, which enhance their connection with the academic community and provide the emotional support needed to navigate the doctoral journey (Kumar & Kaur, 2019).

Furthermore, a study examining the factors that facilitate and hinder the development of research skills in doctoral students enrolled in educational leadership programs highlighted the importance of maintaining high self-efficacy, particularly in the domain of academic and professional research. This factor is crucial for ensuring efficient progression throughout the program and timely completion. Self-efficacy influences students' confidence in conducting research and affects their ability to overcome challenges, manage academic workload, and sustain motivation throughout the doctoral process. Strengthening self-efficacy through academic support strategies and effective supervision can significantly reduce attrition rates and enhance doctoral-level researchers' training (McBrayer et al., 2021).

In Latin America, specifically in Brazil, a study found that the variables associated with higher levels of resilience in doctoral students were age, having children, being retired, earning more than five minimum wages, having had greater problems in other phases of the research schedule, and being from private universities. The conclusion of the study indicated the need for graduate programs to design strategies to address fatigue and promote resilience in these students (das Chagas Valóta et al., 2023), which continues to reaffirm the need to promote students' mental and emotional health beyond academic production or results.

Educational situations greatly affect individuals' mental growth and health, as well as their psychological resources. Among the psychological resources involved in education, academic self-efficacy, academic motivation, and optimism stand out (Mousavi Nasab & Nezhad, 2020). This study is an important antecedent in that it directly addresses elements of psychological capital related to the motivation of doctoral students, offering a comparison between these aspects. It has been found that interest in the field of study is one of the variables that influence the maintenance and increase of the self-efficacy construct over time.

Another interesting background study is the relationship between optimism and resilience in a sample of university students. Resilience refers to the ability to recover and adapt in adversity or stressful

situations. In this context, the study found that approximately 25% of the variability in students' ability to be resilient could be attributed to the level of optimism they possessed. This implies that those students who exhibited a higher degree of optimism also tended to be more resilient (Gómez Molinero et al., 2018). These authors highlight optimism's benefits on physical health and psycho-social well-being, highlighting its positive impact on adaptation to university life, showing that optimistic students are more academically engaged than those who are not optimistic. It is important to note that we understand optimism from two elements – "learned optimism" and "dispositional optimism" – personality traits reflecting a good expectation for the future (Gómez Molinero et al., 2018).

A study in China shows that doctoral students face enormous challenges when trying to complete their degrees (Woolston & O'Meara, 2019). This study is an interesting background as it highlights the role of hope as a driver of educational success. They discuss "high hopes" and argue that doctoral students in China cling to their dreams of academic careers and hope that a degree will increase their chances in the job market. Finally, it emphasizes self-efficacy as a key element in the doctorate and provides a useful framework to help understand the experiences and multiple variables that impact academic success in the context of doctoral studies (Dortch, 2016).

Thus, self-efficacy has been used as an indicator of future student performance, as it reflects the nature, quality, and feedback received by the learner as part of an instructional process (Cernusca & Mallik, 2022). This highlights the importance of training and supervising the work of doctoral students as an integral part of their development and their direct relationship to their research attitudes and behaviors (Bishop et al., 2017).

## Objectives and questions

1. **Objective:** *To describe the characteristics of the study variables (PsyCap, academic motivation, and university academic performance) in terms of low, medium, and high levels.*
   **Research Question:** How are the levels of PsyCap, academic motivation, and university academic performance distributed among doctoral students?

2. **Objective:** *To compare the sample characteristics and study variables, examining potential differences based on gender, age, study cycle, and educational experience for each variable.*
   **Research Question:** Are there significant differences in PsyCap, academic motivation, and university academic performance based on gender, age, study cycle, and educational experience among doctoral students?

3. **Objective:** *To assess motivational dynamics throughout the doctoral process and identify potential variation patterns at different stages of the program.*
   **Research Question:** How does academic motivation fluctuate throughout the doctoral journey, and what patterns of change can be identified?

4. **Objective:** *To examine the relationship between psychological capital (PsyCap), academic motivation, and university academic performance in doctoral students by developing and validating a structural equation model (SEM) to explain their interaction.*
   **Research Question:** What is the relationship between PsyCap, academic motivation, and university academic performance in doctoral students, and how can a structural equation model (SEM) explain their interaction?

5. **Objective:** *To provide evidence-based recommendations to enhance the doctoral student experience.*
   **Research Question:** What strategies and policies can be implemented, based on the study findings, to optimize the academic experience and success of doctoral students?

# METHODOLOGY

## *DESIGN AND SAMPLE*

This research was conducted from a quantitative approach, with a non-experimental design, being a cross-sectional study developed during the first quarter of the year 2024, with a correlational scope that sought to go beyond the description of the variables and explain the relationships between them. The sample was collected by simple random sampling from a population of 256 doctoral students, using a formula suitable for when the variable under study is qualitative, and the size of the population is known (finite population). The resulting sample was 190 doctoral students, distributed as shown in Table 1.

**Table 1. Participants by sex, age, study cycle, and teaching experience**

| Characteristic | Detail | Frequency | Percentage |
|---|---|---|---|
| Sex | Male | 82 | 43.2 |
| | Woman | 108 | 56.8 |
| | **Total** | **190** | **100.0** |
| Age | 20-30 | 6 | 3.2 |
| | 31-40 | 37 | 19.5 |
| | 41-50 | 63 | 33.2 |
| | 51-60 | 73 | 38.4 |
| | 61 + | 11 | 5.8 |
| | **Total** | **190** | **100.0** |
| Study cycle | 1ro | 25 | 13.2 |
| | 2do | 29 | 15.3 |
| | 3ro | 27 | 14.2 |
| | 4to | 23 | 12.1 |
| | 5to | 27 | 14.2 |
| | 6to | 19 | 10.0 |
| | Graduate | 40 | 21.1 |
| | **Total** | **190** | **100.0** |
| Teaching experience | 0 | 2 | 1.1 |
| | 1-5 | 18 | 9.5 |
| | 6-10 | 37 | 19.5 |
| | 11-15 | 31 | 16.3 |
| | 16-20 | 31 | 16.3 |
| | 21+ | 71 | 37.4 |
| | **Total** | **190** | **100.0** |

### Sampling procedures

The study population consisted of 256 doctoral students enrolled in a higher education institution in Lima, Peru. Recruitment was conducted through multiple channels, including invitations sent via institutional email, announcements in the virtual classroom, and communication through program co-

ordinators and advisors. These strategies aimed to maximize participation while ensuring the voluntary nature of the process, resulting in a response from 190 students representing a significant sample of the target population.

### Response rates and implications

Of the 256 doctoral students invited, 190 completed the survey, representing a response rate of 74.2%. This relatively high rate can be attributed to targeted recruitment efforts, especially the support of the program's administrative coordination and thesis advisors, clear communication about the objectives of the study, and assurances of confidentiality.

In a highly cited study on response rates (Baruch & Holtom, 2008), 1607 studies in 17 academic journals were analyzed, identifying 490 that used surveys with more than 100,000 organizations and 400,000 individuals. The average response rate was 52.7% for individual surveys, and it was noted that electronic data collection showed higher response rates than traditional mail. These findings contextualize the response rate of the present study (74.2%), which exceeds the averages reported in previous research, reinforcing the validity of the results.

In a more recent study, Wilson et al. (2024) reported a pooled absolute response rate of 67% in 360 studies included, with a total of 115,526 surveys distributed. They recommend that researchers aim for a minimum rate of 67% in survey-based empirical studies since a higher response rate improves the representativeness of the sample and reduces nonresponse bias, strengthening the validity of the findings. They also emphasize the importance of documenting the validity of the instrument used to guarantee the quality of the results. In this line, the present study also exceeds this established reference.

Thus, with a response rate of 74.2%, the present study reaches a level considered difficult to achieve and above the common threshold of 50-70%. According to Nulty (2008), this rate is sufficiently high for the survey data to provide adequate evidence, which reinforces its validity and minimizes the risk of nonresponse bias. However, uncertainty remains as to what level would ensure optimal representation of the target population.

A response rate above 70% is considered high in survey-based research, suggesting that the findings are representative of the general population of doctoral students. However, the possibility of nonresponse bias should be recognized, as students who chose not to participate could differ significantly from those who did. Future research could implement follow-up strategies, such as reminders or incentives, to further improve response rates and assess possible biases.

### Ethical considerations

Before data collection, the necessary approvals were obtained, and all participants provided informed consent to take part in the study and authorize the publication of results while ensuring data confidentiality. The consent form emphasized the voluntary nature of participation, as well as the commitment to confidentiality and anonymity. Additionally, before administering the survey, an orientation session was conducted with academic advisors, who facilitated the distribution of the questionnaire within their respective cohorts, ensuring clarity regarding the participation requirements.

## *Instruments and Variables*

Three scales were applied through an online platform: the scale of university academic performance (De Lourdes Preciado-Serrano et al., 2021), the academic motivation scale (AMS) (Kotera et al., 2023), and the psychological capital scale (PsyCap Scale) (Lorenz et al., 2016; Platania & Paolillo, 2022). All scales were answered by the participants, who expressed their degree of agreement or disagreement with specific statements, based on five response options: 1 = totally disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = totally agree.

### University academic performance scale

The original university academic performance scale consists of 20 items (De Lourdes Preciado-Serrano et al., 2021). Factor 1 is called contribution to academic activities (10 items), factor 2 is called dedication to study (5 items), and factor 3 is called lack of organization of didactic resources (5 items). The third-factor items are of the negative construct. As we indicated above, for the present study, a pilot application was made to 30 students before the final application, and it was found that the items of the original version had a score below 0.500. They also had a low score in the pilot study, so it was decided to eliminate these six items. As a result, the final scale applied was of 14 items and 3 dimensions, distributed as follows: 7 items for the first dimension (contribution to academic activities), 4 items for the second dimension (dedication to study), and 3 items for the third dimension (lack of organization of didactic resources). An example of an item: "In the doctorate ... I organize myself to be efficient in all academic activities" (dedication to study).

Cronbach's alpha reliability on the original scale (De Lourdes Preciado-Serrano et al., 2021) was acceptable for the first two factors and moderate for the third factor:

- F1 - Contribution to academic activities: α=.792
- F2 - Dedication to study: α=.774
- F3 - Lack of organization of didactic resources: (α=.542)

### Short academic motivation scale (SAMS)

For this study, we assume the short version of the 14-item academic motivation scale (SAMS) (Kotera et al., 2023), which consists of 14 items and 7 dimensions (2 items for each factor) for intrinsic academic motivation, the factors of intrinsic motivation to knowledge (IMK), intrinsic motivation toward achievement (IMA), and intrinsic motivation to experience stimuli (IMS). For extrinsic academic motivation, the factors of identified regulation (IDR), introjected regulation (IJR), external regulation (ER), and finally, the motivation factor (negative factor) were measured. An example of an item: "I am in the doctorate ... for the pleasure I experience when I discover new things never seen before" (IMK). The academic motivation scale (AMS) has been validated by multiple previous studies (Burgueño et al., 2017; Caleon et al., 2015; Davoglio et al., 2016; Guay et al., 2015; Orsini et al., 2015; Tóth-Király et al., 2017; Zhang et al., 2016).

The original study by Kotera et al. (2023) shows that Cronbach's alpha reported for each of the factors of the SAMS is as follows:

- Intrinsic motivation to know: α = .70
- Intrinsic motivation toward accomplishment: α = .70
- Intrinsic motivation to experience stimulation: α = .81
- Identified regulation: α = .66
- Introjected regulation: α = .63
- External regulation: α = .76
- Amotivation: α = .85

### Psychological capital scale (PsyCap Scale)

The psychological capital scale consists of 12 items and four dimensions, divided into three items for each dimension: hope, optimism, resilience, and self-efficacy (Lorenz et al., 2016; Platania & Paolillo, 2022). An example item is: "Right now, I see myself as quite successful" (Hope). Some recent studies have examined the psychometric properties of this scale in the student context (Ikeda et al., 2023; Lou et al., 2022; Matos & De Andrade, 2021), including a study of Latin American university students, specifically from Ecuador (López-Guerra et al., 2023).

The Cronbach's alpha reported in the original PsyCap study was α = .82. (Lorenz et al., 2016) and for each of the variable factors, Cronbach's alpha was:

- Hope: α = .84
- Optimism: α = .82
- Resilience: α = .79
- Self-Efficacy: α = .88

### *Statistical Procedure*

The programs used for data processing were SPSS version 25, AMOS version 24, and R-Project version 4.4.3. The following procedure was followed for data analysis:

1. Reliability was obtained using Cronbach's alpha statistics to guarantee the internal consistency of the instrument as a basic property of psychometrics. Además del theta, omega, composite reliability (CR), and convergent validity were also included using the average variance extracted (AVE).
2. The mean and standard deviation were obtained as descriptive measures of the sample to know the average perception of the variables and dimensions studied. Likewise, it was used to compare the sample characteristics (sex, age, cycle, educational experience) concerning the study variables.
3. The Kolmogorov-Smirnov test was performed for the univariate normality of the data because the sample size analyzed was considered large (n=190) to identify the test statistic to be used in the correlation between the variables and their dimensions (Spearman correlation), and the comparison of the means between the sample characteristics and the study variables (Mann-Whitney U and Kruskal-Wallis H). Multivariate normality tests (Mardia, Royston, Henze-Zirkler, Energy) were performed and were also useful for the appropriate selection of the method for estimating the structural equation model (asymptotic free distribution).
4. For the determination of the scales, the scores were standardized and normalized, with cut-off points of the 33rd and 67th percentiles, obtaining three levels: low (less than or equal to the 33rd percentile), medium (34th to 67th percentile), and high (greater than 67th percentile).
5. The simple absolute frequency and the percentage distribution of the sample surveyed were obtained according to the scales in each variable and dimension studied.
6. The structural equation model was estimated, and the goodness-of-fit metrics and the path graph of the final estimated model were also presented.

## RESULTS

### *Descriptive RESULTS*

Table 2 shows that globally, the three scales had a high internal consistency: Psychological Capital (PsyCap), 0.858, Academic Motivation, 0.844, and University Academic Performance, 0.767. A similar result occurred in all its dimensions, except the resilience dimension of the PsyCap variable, which presents a low level of reliability, and the lack of organization of teaching resources (t) dimension of the University Academic Performance variable, which also presents a low level, besides being the dimension with the lowest average of the three scales. The dimension that reached the highest average was Amotivation (t). If we look at the two extremes (the highest average and the lowest average), they are located in negative dimensions. This suggests the need to review their approach.

In addition, it is observed that all variables and dimensions do not approximate a normal distribution of data, which involves the use of nonparametric statistical analysis. Likewise, the bars were obtained by normalizing and standardizing the data, taking the 33rd and 67th percentiles as cut-off points.

**Table 2. Descriptive characteristics of study variables**

| Variable/ dimension | Media | SD | Cronbach's alpha | # items | Kolmogorov-Smirnov | | Levels | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Statistic | Sig. | Low | Medium | High |
| **Psychological Capital (PsyCap)** | **4.22** | **0.45** | **0.858** | **12** | **0.086** | **0.002** | **48 a -** | **49 a 53** | **54 a +** |
| Hope | 4.17 | 0.58 | 0.746 | 3 | 0.166 | 0.000 | 11 a - | 12 a 13 | 14 a + |
| Optimism | 4.34 | 0.60 | 0.812 | 3 | 0.189 | 0.000 | 12 a - | 13 a 14 | 15 |
| Resilience | 3.96 | 0.58 | 0.370 | 3 | 0.204 | 0.000 | 11 a - | 12 | 13 a + |
| Self-efficacy | 4.42 | 0.53 | 0.874 | 3 | 0.208 | 0.000 | 12 a - | 13 a 14 | 15 a + |
| **Academic motivation** | **4.34** | **0.44** | **0.844** | **14** | **0.084** | **0.002** | **58 a -** | **59 a 64** | **65 a +** |
| Intrinsic motivation to know | 4.38 | 0.62 | 0.671 | 2 | 0.216 | 0.000 | 8 a - | 9 | 10 |
| Intrinsic motivation toward accomplishment | 4.55 | 0.57 | 0.869 | 2 | 0.334 | 0.000 | 8 a - | 9 | 10 |
| Intrinsic motivation to experience stimulation | 4.17 | 0.72 | 0.809 | 2 | 0.187 | 0.000 | 7 a - | 8 a 9 | 10 |
| Identified regulation | 4.50 | 0.56 | 0.730 | 2 | 0.298 | 0.000 | 8 a - | 9 | 10 |
| Introjected regulation | 4.12 | 0.81 | 0.809 | 2 | 0.185 | 0.000 | 7 a - | 8 a 9 | 10 |
| External regulation | 4.11 | 0.82 | 0.832 | 2 | 0.183 | 0.000 | 7 a - | 8 a 9 | 10 |
| A motivation (t) | 4.56 | 0.81 | 0.854 | 2 | 0.361 | 0.000 | 9 a - | | 10 |
| **University academic performance** | **3.79** | **0.43** | **0.767** | **14** | **0.082** | **0.003** | **50 a -** | **51 a 55** | **56 a +** |
| Contribution to academic activities | 3.97 | 0.51 | 0.766 | 7 | 0.099 | 0.000 | 26 a - | 27 a 29 | 30 a + |
| Dedication to study | 3.74 | 0.60 | 0.720 | 4 | 0.116 | 0.000 | 14 a - | 15 a 16 | 17 a + |
| Lack of organization of teaching resources (t) | 3.46 | 0.72 | 0.416 | 3 | 0.099 | 0.000 | 9 a - | 10 and 11 | 12 a + |

According to the Theta, Omega, and Composite Reliability (CR) coefficients, the questionnaires show good internal consistency, confirming Cronbach's alpha values. On the other hand, the convergent validity according to the Average Variance Extracted (AVE) shows that the construct of psychological capital and academic motivation explains more than half of the variance in its indicators. In contrast, the construct of university academic performance presents a low convergent validity of less than 0.5, which could require adjustments in the scale (Table 3).

At the same time, the results confirm the multivariate non-normality of the data in the three constructs, suggesting the presence of skewness and kurtosis outside the acceptable ranges for a normal distribution. This condition justifies the use of robust estimators in subsequent analyses, ensuring the validity of statistical inferences and minimizing bias in the interpretation of the results (Table 4).

This can be seen graphically in Figure 1. The density graphs show the distribution of the dimensions of three constructs: Psychological Capital (PsyCap), Academic Motivation, and University Academic Performance, evidencing differentiated patterns in each.

**Table 3. Reliability and convergent validity analysis of the variables**

| Variable | Coefficient | | AVE | CR |
|---|---|---|---|---|
| | Theta | Omega | | |
| Psychological Capital (PsyCap) | 0.889 | 0.840 | 0.618 | 0.947 |
| Academic Motivation | 0.873 | 0.850 | 0.808 | 0.983 |
| University Academic Performance | 0.821 | 0.778 | 0.455 | 0.915 |

**Table 4. Multivariate normality**

| Variable | Mardia | | | | Royston | | Henze-Zirkler | | Energy | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Skewness | | Kurtosis | | | | | | | |
| | Value | *p-value* | Value | *p-value* | Value | *p-value* | Value | *p-value* | Value | *p-value* |
| Psychological Capital (PsyCap) | 1289.825 | < 0.001 | 14.368 | < 0.001 | 780.759 | < 0.001 | 1.127 | < 0.001 | 3.181 | < 0.001 |
| Academic Motivation | 1244.945 | < 0.001 | 24.384 | < 0.001 | 783.923 | < 0.001 | 2.574 | < 0.001 | 6.162 | < 0.001 |
| University Academic Performance | 2825.897 | < 0.001 | 39.200 | < 0.001 | 964.339 | < 0.001 | 2.741 | < 0.001 | 8.485 | < 0.001 |

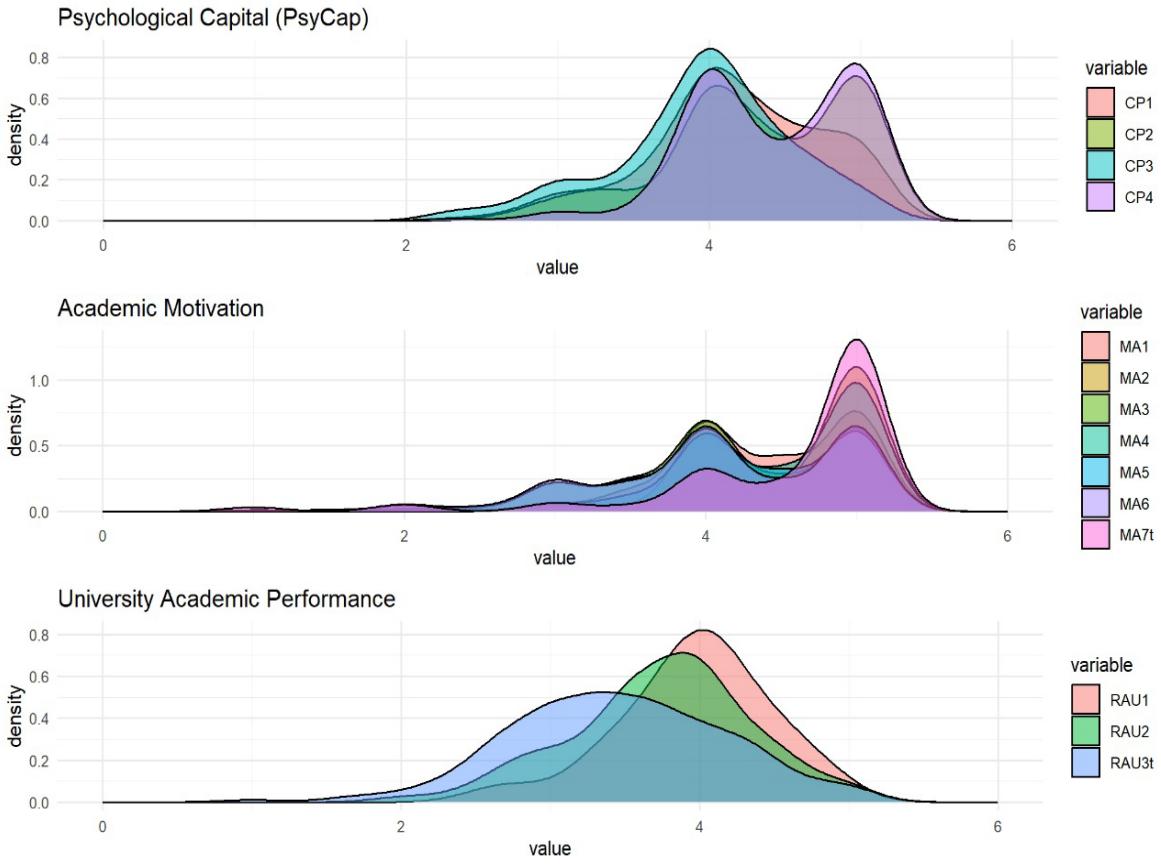


**Figure 1. Densities of the dimensions of the three constructs**

Another group of results shows that the internal correlations between the variables and the dimensions are high, except for the university academic performance variable with the lack of organization of teaching resources dimension, which presents a low correlation (0.509), and the correlation between the academic motivation variable and the amotivation dimension, which presents a very low correlation (0.398). On the other hand, low external correlations are observed between the variables and the dimensions (Figure 2).

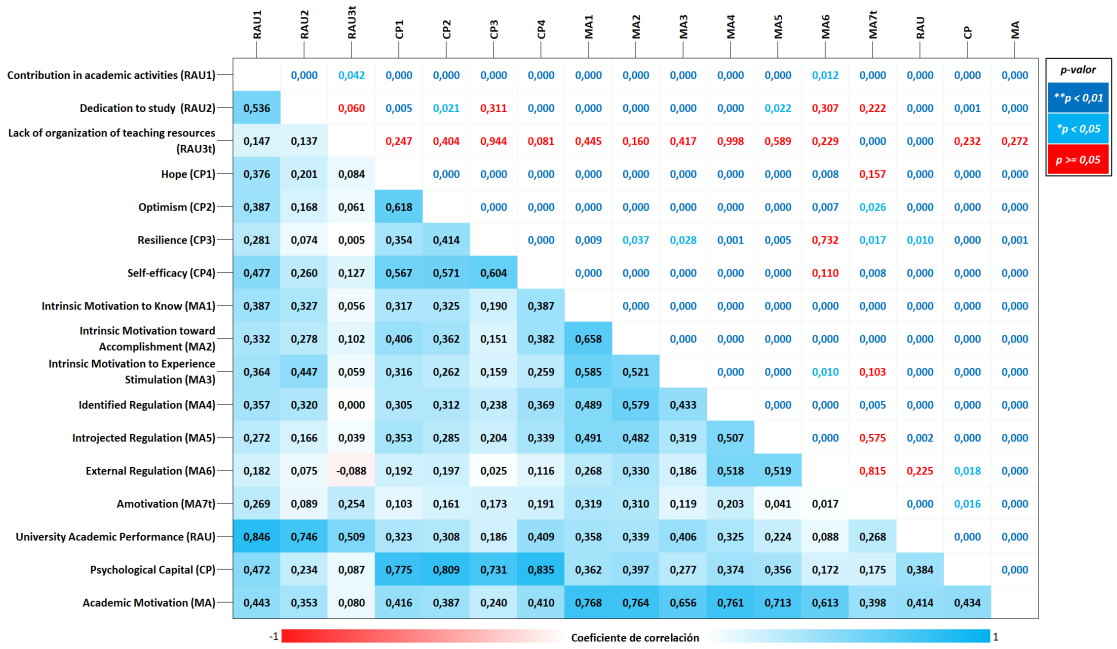


**Figure 2. Spearman correlation test between variables and dimensions**

Table 5 shows that 38% of the respondents have a low level of psychological capital, 35% have a low level of academic motivation, and 36% have a high level of university academic performance. One of the relevant findings we found in amotivation (which is the lack of motivation or low level of it) was the results were divided into two extreme groups (PA lower than 33% and PA higher than 66%), i.e., a group with low level and another group with high level, finding that the medium level has 0%. This dichotomy reflects a psychological tendency of the human behavior of doctoral students and clearly shows two motivational profiles (which sheds light on the understanding of motivation). It highlights the danger of a lack of motivation for doctoral success.

**Table 5. Frequency of occurrence of the variables and dimensions according to scales**

| Variable/dimension | Low | | Medium | | High | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Psychological Capital (PsyCap) | 72 | 38% | 54 | 28% | 64 | 34% |
| Hope | 41 | 22% | 92 | 48% | 57 | 30% |
| Optimism | 80 | 42% | 48 | 25% | 62 | 33% |
| Resilience | 62 | 33% | 65 | 34% | 63 | 33% |
| Self-efficacy | 78 | 41% | 46 | 24% | 66 | 35% |
| Academic Motivation | 67 | 35% | 62 | 33% | 61 | 32% |
| Intrinsic Motivation to Know | 84 | 44% | 35 | 18% | 71 | 37% |

| Variable/dimension | Low | | Medium | | High | |
|---|---|---|---|---|---|---|
| | n | % | n | % | n | % |
| Intrinsic Motivation toward Accomplishment | 69 | 36% | 17 | 9% | 104 | 55% |
| Intrinsic Motivation to Experience Stimulation | 45 | 24% | 86 | 45% | 59 | 31% |
| Identified Regulation | 71 | 37% | 27 | 14% | 92 | 48% |
| Introjected Regulation | 49 | 26% | 84 | 44% | 57 | 30% |
| External Regulation | 50 | 26% | 79 | 42% | 61 | 32% |
| Amotivation (t) | 66 | 35% | 0 | 0% | 124 | 65% |
| University Academic Performance | 64 | 34% | 57 | 30% | 69 | 36% |
| Contribution to academic activities | 60 | 32% | 74 | 39% | 56 | 29% |
| Dedication to study | 74 | 39% | 72 | 38% | 44 | 23% |
| Lack of organization of teaching resources (t) | 67 | 35% | 66 | 35% | 57 | 30% |

Table 6 shows that there are significant differences between males and females in academic motivation (p-value = 0.032), there are significant differences between study cycles with academic motivation (p-value = 0.005), and between study cycles with university academic performance (p-value = 0.004).

**Table 6. Non-parametric tests for comparison between sample characteristics and study variables**

| Variable | Detail | | Psychological capital (PsyCap) | Academic motivation | University academic performance |
|---|---|---|---|---|---|
| **Sex** | U de Mann-Whitney [Sig. asymptotic] | | 0.660 | **0.032** | 0.337 |
| | Average score | Women | 4.23 | 4.40 | 3.77 |
| | | Male | 4.21 | 4.27 | 3.83 |
| **Age** | H de Kruskal-Wallis [Sig. asymptotic] | | 0.184 | 0.051 | 0.111 |
| | Average score | 20 - 30 | 3.93 | 4.29 | 3.45 |
| | | 31 - 40 | 4.32 | 4.51 | 3.85 |
| | | 41 - 50 | 4.16 | 4.22 | 3.74 |
| | | 51 - 60 | 4.24 | 4.37 | 3.80 |
| | | 61 + | 4.27 | 4.32 | 4.05 |
| **Cycle** | H de Kruskal-Wallis [Sig. asymptotic] | | 0.166 | **0.005** | **0.004** |
| | Average score | 1ro | 4.37 | 4.45 | 3.71 |
| | | 2do | 4.14 | 4.23 | 3.55 |
| | | 3ro | 4.03 | 4.15 | 3.72 |
| | | 4to | 4.17 | 4.20 | 3.86 |
| | | 5to | 4.27 | 4.37 | 3.84 |
| | | 6to | 4.29 | 4.38 | 3.73 |
| | | Graduate | 4.28 | 4.52 | 4.03 |

| Variable | Detail | | Psychological capital (PsyCap) | Academic motivation | University academic performance |
|---|---|---|---|---|---|
| **Teaching experience** | H de Kruskal-Wallis [Sig. asymptotic] | | 0.539 | 0.310 | 0.484 |
| | Average score | 0 - 5 | 4.29 | 4.43 | 3.72 |
| | | 6 - 10 | 4.14 | 4.22 | 3.71 |
| | | 11 - 15 | 4.23 | 4.29 | 3.84 |
| | | 16 - 20 | 4.28 | 4.38 | 3.89 |
| | | 21 + | 4.21 | 4.38 | 3.79 |

We highlight a finding that shows the behavior of a "motivational curve" in doctoral students (Figure 3). This finding, which shows high motivation at the beginning of the program, a sharp drop in motivation during the program, and a rebound towards the end, is significant because it offers a deeper understanding of the challenges faced by these students and allows us to identify critical points in their educational trajectory. This finding provides a basis for developing specific support strategies, optimizing academic programs, and improving retention and doctoral success. These results enable informed decisions to be made for the doctoral program under study.

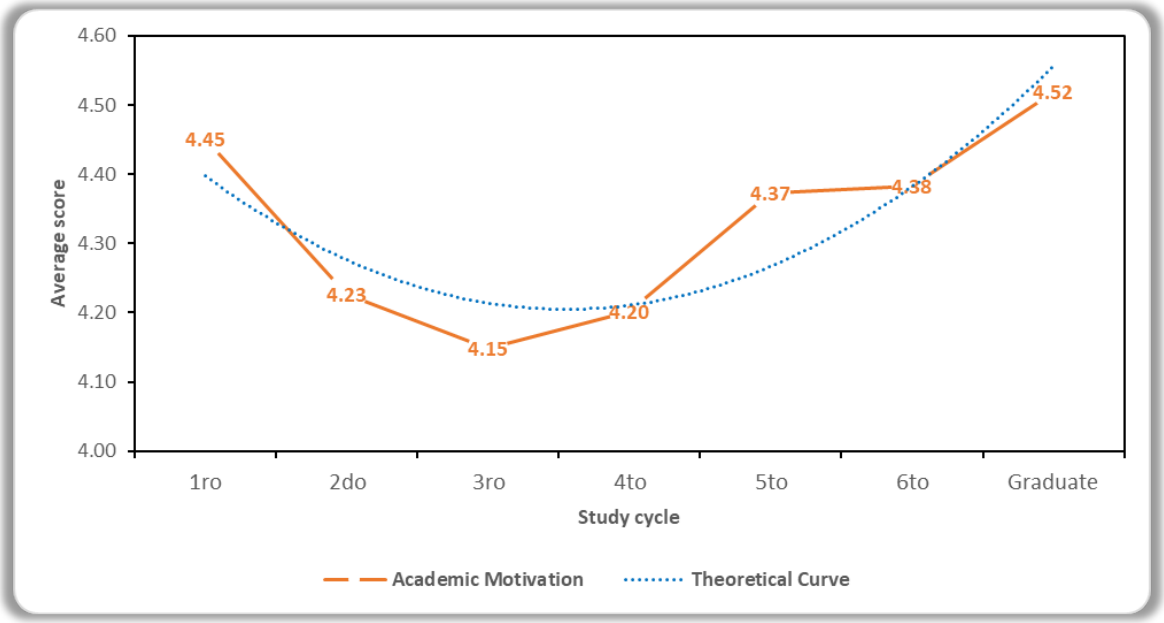


**Figure 3. Motivational curve during the doctoral program**

**Stage 1.** At the beginning of the doctoral program, students reflect on being highly motivated, which can be related to the excitement of starting a new academic challenge, the expectations of future achievements, and the novelty of the environment. This initial phase represents a peak of the motivational curve.

**Stage 2.** As students progress through the program and face academic, emotional, and personal challenges, their motivation declines, particularly during the second and third cycles. A sharp drop in motivation is observed from the first to the second cycle, reaching its lowest point in the third cycle, where the lowest level of psychological capital is also recorded. This third cycle is considered the

most challenging, reflecting the downward phase of the motivational curve. This decline may be associated with stress, fatigue, uncertainty about the future, or a perceived lack of tangible progress in research, coinciding with the highest doctoral attrition rates.

**Stage 3.** As students overcome these obstacles, receive additional support, or reach important milestones in their research (such as the publication of scientific articles, successful completion of comprehensive exams, approval of their dissertation proposal, participation in academic conferences, or securing research funding), their motivation begins to increase again. A progressive and steady increase is observed beginning in the 4th cycle, continuing to rise in the 5th and 6th cycles, and reaching its highest peak at graduation, reflecting the upward part of the curve. This increase could be driven by a renewed sense of purpose, anticipation of program completion, or recognition of their achievements.

## *Structural Equation Model Results*

For the estimation of the structural equation model, the Psychological Capital (PsyCap) variable is composed of four dimensions, the Academic Motivation variable is composed of seven dimensions, and the University Academic Performance variable is composed of three dimensions, all of them summarized in the corresponding averages of their items. On the other hand, the data of the study variables do not present a multivariate normal distribution since the value of the multivariate normality test Mardia concerning the multivariate kurtosis $(b_{2.p} = 15{,}225)$ was higher than the theoretical value of the normal distribution at a 95% confidence level. Therefore, the estimation of the structural equation model was performed using the asymptotic free distribution estimation method since it is an estimation method that is robust to deviations from multivariate normality.

Table 7 shows that all the dimensions of the PsyCap variable are linearly positively related, with a predominance in the Self-efficacy dimension (0.839) and a lower weight in the Resilience dimension (0.640). Recall that resilience was one of the dimensions with a low internal consistency, reinforcing the need to review this dimension for future studies. Likewise, all the dimensions of the Academic Motivation variable are linearly positively related, with a predominance in the Intrinsic Motivation to Know dimension (0.887) and a lower weight in the External Regulation dimension (0.391). In addition, all the dimensions of the variable University Academic Performance are linearly positively related, with predominance in the dimension Contribution in academic activities (0.862) and lower weight in the dimension Lack of organization of teaching resources (t) (0.185); precisely this was the other dimension that had a low internal consistency, and was the dimension with the lowest average response of the respondents, so it needs to be revised.

**Table 7. Structural equation modeling of psychological capital (PsyCap), academic motivation, and university academic performance**

| Relation (<---) / variability (<-->) | | | Regression weights | | S.E. | C.R. | P |
|---|---|---|---|---|---|---|---|
| | | | Estimate | Standardized | | | |
| Academic motivation | <--- | Psychological Capital (PsyCap) | 0.795 | 0.667 | 0.084 | 9.435 | *** |
| University academic performance | <--- | Academic Motivation | 0.411 | 0.407 | 0.079 | 5.212 | *** |
| University academic performance | <--- | Psychological Capital (PsyCap) | 0.434 | 0.361 | 0.093 | 4.666 | *** |
| Contribution to academic activities | <--- | University Academic Performance | 1 | 0.862 | | | |
| Dedication to study | <--- | University Academic Performance | 0.778 | 0.637 | 0.077 | 10.108 | *** |

| Relation (<---) / variability (<-->) | | | Regression weights | | S.E. | C.R. | P |
|---|---|---|---|---|---|---|---|
| | | | Estimate | Standardized | | | |
| Lack of organization of teaching resources (t) | <--- | University Academic Performance | 0.285 | 0.185 | 0.119 | 2.398 | 0.016 |
| Hope | <--- | Psychological Capital (PsyCap) | 1 | 0.684 | | | |
| Optimism | <--- | Psychological Capital (PsyCap) | 1.278 | 0.795 | 0.102 | 12.498 | *** |
| Resilience | <--- | Psychological Capital (PsyCap) | 0.904 | 0.64 | 0.094 | 9.652 | *** |
| Self-efficacy | <--- | Psychological Capital (PsyCap) | 1.194 | 0.839 | 0.1 | 11.914 | *** |
| Intrinsic motivation to know | <--- | Academic Motivation | 1 | 0.887 | | | |
| Intrinsic motivation toward accomplishment | <--- | Academic Motivation | 1 | 0.849 | 0.053 | 18.716 | *** |
| Intrinsic motivation to experience stimulation | <--- | Academic Motivation | 0.91 | 0.653 | 0.066 | 13.724 | *** |
| Identified regulation | <--- | Academic Motivation | 0.87 | 0.778 | 0.058 | 15.083 | *** |
| Introjected regulation | <--- | Academic Motivation | 0.852 | 0.611 | 0.084 | 10.131 | *** |
| External Regulation | <--- | Academic Motivation | 0.554 | 0.391 | 0.097 | 5.683 | *** |
| Amotivation (t) | <--- | Academic Motivation | 0.799 | 0.658 | 0.11 | 7.267 | *** |
| Lack of organization of teaching resources (t) | <--- | Introjected Regulation | 0.211 | 0.189 | 0.08 | 2.628 | 0.009 |
| Self-efficacy | <--- | Lack of organization of teaching resources (t) | 0.094 | 0.122 | 0.027 | 3.436 | *** |
| Resilience | <--- | Dedication to study | -0.144 | -0.15 | 0.049 | -2.922 | 0.003 |
| e2 | <--> | e4 | -0.041 | -0.443 | 0.012 | -3.487 | *** |
| e3 | <--> | e4 | 0.033 | 0.31 | 0.012 | 2.656 | 0.008 |

Note: e = estimation errors

On the other hand, introjected regulation is positively related to lack of organization of teaching resources (t) (0.198), lack of organization of teaching resources (t) is positively related to self-efficacy (0.122), and dedication to study is negatively related to resilience (-0.150).

Finally, the errors e2 with e4 and e3 with e4 present variability, meaning that they have something indirect in common between the corresponding dimensions that were not measured, and that they affect indirectly through their errors.

According to the fit indicators, it can be said that the estimated structural model is acceptable since it meets three of the goodness-of-fit indicators (Table 8) (Byrne, 2016).

**Table 8. Structural equation model goodness-of-fit indicators for psychological capital (PsyCap), academic motivation, and university academic performance**

| Name | Adjustment measure | Value | Acceptable limit* |
|---|---|---|---|
| Normed Fit Index | NFI | 0.742 | ≥ 0.90 |
| Goodness of Fit Index | GFI | 0.936 | ≥ 0.90 |
| Comparative Fit Index | CFI | 0.868 | ≥ 0.90 |
| Tucker-Lewis Index | TLI | 0.826 | ≥ 0.90 |
| Incremental Fit Index | IFI | 0.876 | ≥ 0.90 |
| Adjusted Goodness of Fit Index | AGFI | 0.903 | ≥ 0.85 |
| Relative Fit Index | RFI | 0.659 | ≥ 0.90 |
| Root Mean Square Error of Approximation | RMSEA | 0.060 | ≤ 0.05 |
| Root Mean Square Residual | RMR | 0.076 | ≤ 0.10 |

* (Byrne, 2016)

The GFI (0.936), AGFI (0.903), RMSEA (0.060), and RMR (0.076) indicators meet the fit values established in the literature (Byrne, 2016), suggesting an adequate model fit. In particular, the GFI and AGFI indicate an overall good fit between the observed data and the proposed theoretical model. For its part, the RMSEA, being within the acceptable threshold (≤ 0.08), suggests a low approximation error, indicating that the model adequately represents the underlying structure of the data. Likewise, the RMR, by remaining below the critical value (≤ 0.10), suggests that the discrepancies between the observed and estimated covariance matrix are minimal, reinforcing the validity of the model in terms of its explanatory capacity. Finally, Figure 4 presents the structural equation model of Psychological Capital (PsyCap), Academic Motivation, and University Academic Performance.

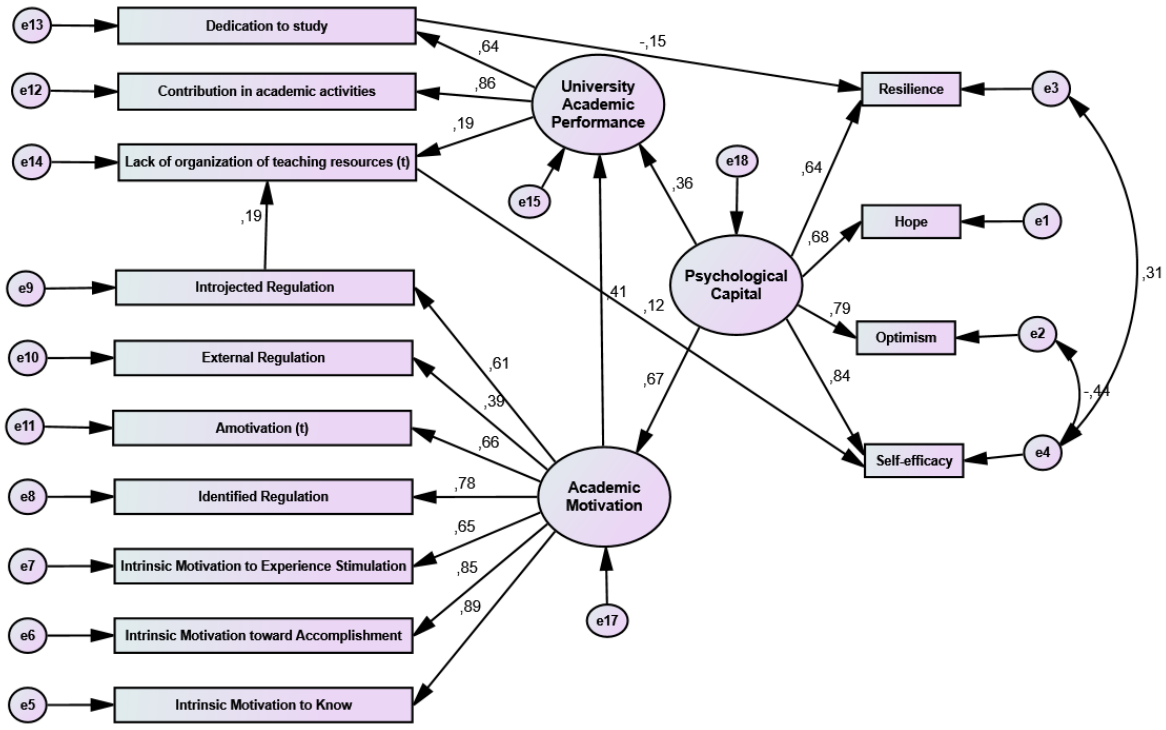


**Figure 4. Structural equation modeling of psychological capital (PsyCap), academic motivation, and university academic performance**

*Note:* Standardized coefficients

# DISCUSSION

In this section, we begin with a discussion of the three significant relationships revealed in the structural equation model: (1) the introjected regulation is positively related to the lack of organization of teaching resources (t) (0.198), (2) the lack of organization of teaching resources (t) is positively related to self-efficacy (0.122), and (3) dedication to study is negatively related to resilience (-0.150).

## *INTROJECTED REGULATION AND ORGANIZATION OF TEACHING RESOURCES*

For this relationship, it is valid to emphasize that lack of organization of teaching resources (t) = organization of teaching resources, so we prefer to write it positively for better understanding: Positive relationship between introjected regulation and the organization of teaching resources. This can be described as follows: high introjected regulation is related to the high organization of teaching resources, while low introjected regulation is related to the low organization of teaching resources; this is directly associated with the findings that show that high levels of introjected regulation are associated with stronger academic performance (Wormington et al., 2012).

Recall that introjected regulation refers to a type of extrinsic motivation, where the driving force of motivation is "outside" norms, roles, academic demands, and standards, which are internalized by the subject, achieving a significant impact on the motivation of doctoral students and the way they organize didactic resources, this is reflected in greater management of adequate material to understand the courses, class attendance, planning for exams. In this regard, a previous study has also found that introjected regulation represents a powerful but complex motivator for in-service teachers concerning their professional development (Proudfoot, 2022), whereas other studies have found that introjected regulation significantly impacts learning achievement (Akbar & Hartati, 2020) and is positively related to persistence and performance objectives, but also to indicators of discomfort (Howard et al., 2021); while a three-way interaction between normative commitment, intrinsic motivation and introjected regulation has also been found to decrease turnover intention (Gajenderan et al., 2023).

As a result, much progress remains to be made, as demonstrated by a study that focused on creating and validating a scale grounded in self-determination theory to evaluate five types of regulation (intrinsic, integrated, identified, introjected, and external) about doctoral studies. The findings revealed that introjected regulation was linked to all negative outcomes and showed an inverse relationship with most positive outcomes, including satisfaction with overall studies and the university, positive emotions, and academic performance (Litalien et al., 2015), further considering that introjected regulation is positively associated with indicators of distress (Howard et al., 2021).

From the above, it can be synthesized that introjected regulation in the context of doctoral education refers to when doctoral students adopt externally imposed norms, values, expectations, goals, and standards as their own without a true understanding of their meaning or full integration into their sense of self. In this sense, introjected regulation is a type of extrinsic motivation in which the student carries out an activity not because he/she finds it inherently satisfying, interesting, or valuable, but because he/she feels a duty, normative commitment, and responsibility to fulfill it. Thus, actions performed under introjected regulation may be driven by social pressure, the need for approval, or fear of failure. An example of introjected regulation in the doctorate might be studying for an exam not because one enjoys learning but because one feels social pressure to get good grades and have a doctorate, which may impair eudaemonic well-being that is associated with true happiness, affective involvement, interest, motivation, and joy (Ilies et al., 2005).

Despite all the above, the present study reveals that, although introjected regulation is considered a form of extrinsic motivation, it can positively influence the organization of didactic resources, and this may be related to several reasons:

### Commitment to external standards and expectations

Doctoral students who are motivated by introjected regulation have a strong tendency to comply with external standards and expectations. This means they are more likely to engage in academic tasks and responsibilities, such as attending classes, turning in assignments on time, and retaining subject content, because they feel pressure to meet these standards.

### Sense of duty and responsibility

Introjected regulation implies a sense of duty and responsibility to internalize external norms and values. This can lead to greater discipline and commitment to academic activities, including the organization of resources necessary for academic success, such as adequate sleep time and the organization of study materials.

### Avoiding school failure or failing exams

Doctoral students motivated by introjected regulation may be driven by the desire to avoid these aspects associated with non-compliance with external norms. This may motivate them to take proactive steps to organize their resources and meet academic expectations, such as turning in assignments on time and regularly attending classes.

### Establishing positive routines and habits

Internalizing external norms and values can lead to the formation of positive routines and habits in organizing learning resources. For example, students can establish regular study schedules, prioritize adequate sleep, and maintain an organized system for their study materials to meet academic expectations.

## *Organization of Teaching Resources*

For this relationship, it is valid to highlight that Lack of organization of teaching resources (t) = organization of teaching resources, so we prefer to write it positively for a better understanding: Positive Relationship between the Organization of teaching resources and Self-efficacy.

The findings of the present study reveal that the organization of didactic resources, which includes elements such as adequate sleep hours, organization of study materials, retention of thematic content, timely delivery of activities, and class attendance, positively influences the self-efficacy of doctoral students. Self-efficacy refers to one's belief in one's ability to successfully perform a specific task or achieve certain goals. Hence, the organization of teaching resources contributes to strengthening this belief by providing an environment conducive to academic performance.

Previous studies support these results, as it has been determined that task involvement variables (directly related to the organization of didactic resources) improve students' self-efficacy (Schunk, 1989). Three dimensions of graduate students' academic strength (engagement, affect control, and challenge) were also found to be strong predictors of their academic self-efficacy (Cheng et al., 2019).

Other findings indicate that the relationship between students' self-efficacy and academic achievement is mediated by metacognitive techniques and emotions associated with learning (Hayat et al., 2020), whereas academic achievement and academic self-efficacy are mediated by academic self-discipline (Jung et al., 2017).

Thus, for specific strategies, aspects of academic performance can be promoted as a process to favorably impact self-efficacy, for example, discussing with students the value of online assignments, as they positively predict self-efficacy (Egbert et al., 2015), promote factors that significantly impact self-efficacy such as research interest, research identity, professional goals, research productivity, research attitudes, training environment, and working alliance with advisor (Livinţi et al., 2021), improving students' perception of the research training environment as it moderates the relationship between research self-efficacy and research productivity (Woo et al., 2023) and finally to promote

greater interest in research and experience in academic publications, as this is positively associated with self-efficacy in research (Lambie & Vaccaro, 2011).

All the above highlights that "doctoral research" is transversal and becomes a dynamic axis during the doctoral career; hence, the development of epistemic and research competencies is essential to strengthen self-efficacy and achieve success in the doctorate.

Finally, it is summarized that the organization of teaching resources improves self-efficacy since maintaining a regular sleep schedule helps to improve concentration and cognition, which in turn increases the student's confidence in his or her ability to understand and retain information. Effective organization of study materials and timely delivery of activities reduce stress and increase a sense of control and accomplishment over the learning process, which strengthens self-efficacy. Likewise, regular class attendance provides opportunities for interaction with the material and the teacher, which can increase the student's confidence in his or her ability to master the concepts presented.

## *Dedication to Study and Resilience*

The present study has found statistical evidence that allows us to affirm a negative relationship between dedication to study and resilience. The relationship between dedication to study and resilience may be complex and depends on several factors. On the one hand, dedication to study can be a sign of commitment and determination, qualities that are important components of resilience; however, the present study shows that extreme dedication to study can have negative effects on resilience; this result is an urgent warning, to avoid stress, burnout, or lack of balance in life. While resilience implies the capacity to recover and adapt flexibly to difficult situations, excessive dedication to study can undermine this capacity if it is not balanced with self-care, stress management, and the maintenance of social relationships and creative and recreational activities.

In the context of doctoral education, dedication to study, while fundamental to academic success, can present significant challenges to student resilience. Extreme dedication, characterized by long hours of study, exhaustive planning, and obsessive preoccupation with exams, can lead to physical and emotional exhaustion, social isolation, lack of flexibility and adaptability, and neglect of personal well-being. These factors can undermine a student's ability to recover from academic and personal setbacks and to adapt effectively to challenges. Therefore, doctoral students must find a healthy balance between academic work and self-care to foster both academic success and resilience.

Scientific evidence demonstrates that resilience acts as a protective factor in the mental health of doctoral students (McKenzie et al., 2022). However, student resilience is a complex process that depends on the interrelationship between personal, environmental, social, and institutional aspects (McCray & Joseph-Richard, 2020). Doctoral students often experience common feelings such as uncertainty, fear of failure, and stress, especially during writing. Stress and anxiety are so common that, in some cases, they become normalized (Martínez-García et al., 2025). Given that academic demands have been shown to increase stress and affect performance (Knoster & Goodboy, 2020), it is essential to implement institutional strategies that promote academic resilience, preventing the dedication to study from becoming excessive and detrimental. This invites further reflection on the complexity of school commitment in research on the student experience (Fredricks et al., 2004)

Previous studies support this result by demonstrating that high dedication to study can hinder the resilience of university students (Brewer et al., 2019) and that academic overcommitment can trigger stress and depression in students, affecting their ability to overcome difficulties and return to success (Zulfikar, 2022). Also, academic overload can affect students' resilience and mental health (Morales, 2008), just as an obsession with grades can lead to increased test anxiety and stress, which may affect students' self-esteem and overall mental health (Marcus & Tomasi, 2020). Therefore, a call is made from this study since there may be a fine line between a balanced, healthy dedication to study and the other extreme – academic obsession, compulsion for study, excessive absorption in academic work,

and academic hyper-dedication – which are aspects that undermine the mental health and resilience of the student.

In the same way, some studies have found opposite results and claim that high dedication to study cannot harm resilience since it is a psychological factor related to positive affectivity, optimism, cognitive flexibility, coping, social support, emotion regulation, and mastery (Yehuda et al., 2006). Studies along the same lines argue that a high level of dedication to study can contribute to developing and maintaining resilience (Lamb & Cogan, 2016) and postulate that dedication to study is positively related to resilience, which in turn influences the support networks of university students (Fernández-Martínez et al., 2017) and that higher levels of resilience predict higher levels of positive mental health in college students (Wu et al., 2020).

These opposing results highlight an unresolved area in doctoral studies and evidence of the complexity of the relationship between dedication to study and resilience, suggesting that various factors and uncontrolled variables may influence this dynamic. While some studies warn about the risks of extreme dedication, others highlight the benefits of a solid commitment to study for the development of resilience. Ultimately, the importance of finding a healthy balance between academic work and self-care to promote both academic success and resilience in college students is underscored.

In future research, it is essential to explore how various contextual, personal, and sociodemographic factors influence the relationship between dedication to study and resilience. This implies analyzing how the type of academic program, institutional culture, and social expectations may modulate these dynamics. Understanding these contexts in more depth would allow for the development of more precise interventions tailored to the specific needs of students. In addition, it would be beneficial to examine in detail the coping strategies that students employ to manage the stress associated with studying and how these strategies impact their resilience. Identifying which coping methods are most effective in different educational settings could provide important insights for promoting resilience among doctoral students.

## *Scientific Evidence of the Relationships Between the Study Variables*

The exploration of the confluence between psychological capital, academic motivation, and university academic performance has been a limited undertaking due to the scarcity of specialized scientific literature. However, we have sought to transcend this limitation through this research and complement it with the systematization of scientific evidence. This allowed us to identify studies that address the interrelationship by pairs of variables, i.e., the relationship between psychological capital and motivation, motivation and performance, and psychological capital and academic performance. Such an approach allows us to discern the complex relationships between these variables with greater precision. It is presented as a valuable strategy to deepen the understanding of these intersections of vital importance in the context of doctoral education.

### Relationship between psychological capital and motivation

Findings show that there is a significant positive relationship between positive psychological capital (hope, resilience, optimism, and efficacy) with performance and satisfaction (F. Luthans et al., 2007) and that psychological capital reinforces motivation, commitment, and achievement (Datu et al., 2018), PsyCap being associated with lower levels of demotivation (Datu et al., 2018).

About the above, another study found from a regression analysis that resilience significantly and positively affects achievement motivation (Herdem, 2019), and more recently it continues to be reinforced that psychological capital (self-efficacy, hope, optimism, and resilience) is associated with intrinsic motivation (intrinsic motivation to know, intrinsic achievement motivation and intrinsic motivation to experience stimulation) (A. L. B. Castro, 2023), while other findings highlight the importance of an individual's positive psychological capital in activating the resources and motivation needed to develop innovative behavior (Blasco-Giner et al., 2023).

## Relationship between motivation and performance

Several studies emphasize the relationship between motivational aspects and student performance, highlighting the importance of intrinsic motivation and metacognitive strategies in students' academic performance (Ibrahim et al., 2017). Research argues that high metacognitive awareness and academic motivation positively impact students' academic performance (Abdelrahman, 2020) as they enhance self-regulation, goal-setting, and persistence in learning. Furthermore, these factors contribute to the development of adaptive learning behaviors, enabling students to manage challenges and improve their overall academic outcomes effectively.

Professionals must consider the different types of motivation among doctoral students and their implications for mental health and doctoral progress (Cardoso et al., 2025), as motivation plays a crucial role in persistence, engagement, and academic success at this advanced stage of education. Intrinsic motivation, characterized by genuine interest and personal satisfaction in research, is associated with greater psychological well-being and a lower likelihood of burnout. In contrast, extrinsic motivation, driven by external factors such as academic recognition or rewards, can create pressure and stress if not properly managed. Additionally, amotivation, or the lack of a clear purpose in doctoral studies, may lead to anxiety, demotivation, and, in some cases, program attrition. Therefore, institutions and supervisors need to foster a supportive environment that enhances doctoral students' autonomy, sense of competence, and social connection, thereby minimizing factors that could negatively impact their mental health and academic development.

Overall, academic motivation in university students increases after psychological and emotional intervention (Nawa & Yamagishi, 2021). This opens a space for reflection on the need for this type of psycho-educational intervention in the doctoral program to increase academic motivation since it has been shown that this motivation has a positive influence on the attitudes of university students toward learning (Tasgin & Coskun, 2018) and partially mediates the relationship between academic self-efficacy and procrastination (Malkoç & Mutlu, 2018) and is an important predictor of doctoral students' academic performance, in combination with supervisor performance, having a scholarship and creating research networks (Coromina et al., 2011)

Finally, it is argued as an essential aspect that high academic motivation is related to higher levels of effort in learning (Kotera et al., 2023). The relationship between high academic motivation and higher levels of effort in learning is a topic of great importance in educational psychology and pedagogy. This favors the optimization of academic performance. Motivated students invest more time and effort in their academic work, leading to better performance, persistence, and tenacity. High academic motivation supports self-discipline and self-regulation, helping students set goals, manage time, and use effective study strategies. It also enhances learning quality, as motivated students strive for deep understanding and real-world application, rather than passive memorization, making learning more meaningful and enjoyable.

## Relationship between psychological capital and academic performance

PsyCap plays a key role in behaviors that lead to higher levels of academic achievement. (Chaffin et al., 2023). The results indicate that psychological capital is also related to academic engagement and persistence, in addition to performance (Wanmei, 2025). Findings suggest that developing interventions that strengthen students' resources by increasing their hope, resilience, self-efficacy, and optimism could foster their engagement in study and academic achievement and protect them from burnout and boredom. (Vîrgă et al., 2022). These findings underscore the relevance of implementing interventions aimed at enhancing students' psychological resources, thus contributing to a healthier and more productive educational environment.

In a previous study, although no direct relationship was found between study support climate and academic performance, the results show that PsyCap, positive emotions, and commitment to study

play a mediating role in this relationship. Furthermore, the results reveal a multifaceted pattern between PsyCap, positive emotions, and commitment to study that promotes academic performance (Slåtten et al., 2021)

Additional findings validated the hypothesis that the association between pleasant emotions and academic achievement is mediated by academic psychological capital and academic engagement. This suggested approach has both practical and theoretical ramifications for educational environments and future study. To increase academic psychological capital and academic engagement, which can result in improved academic accomplishment, principals, instructors, and parents have a significant challenge in encouraging good feelings in their kids (Carmona-Halty, Salanova, et al., 2021)

We identified several significant papers in 2019 that add to the conversation about the connection between academic achievement and psychological capital. We start with a study conducted in Latin America. The study looks at how Chilean students' psychological capital, engagement, and academic success are predicted by pleasant emotions. The findings indicate that the three dependent variables under consideration have a significant influence (Carmona-Halty, Villegas-Robertson, et al., 2019)

It has also been discovered that academic psychological capital, or PsyCap, acts as a mediator between students' academic achievement and the fulfillment of their fundamental psychological requirements. Accordingly, pupils who have their basic psychological needs met at school exhibit higher levels of hope, efficacy, resilience, and optimism (PsyCap), all of which contribute to improved academic achievement (Carmona-Halty, Schaufeli, et al., 2019)

Additional findings indicated that PsyCap, academic performance, and academic engagement were positively correlated in both samples. The findings further validated PsyCap's role as a comprehensive mediator in the connection between academic achievement and engagement. The findings highlight the significance of considering psychological factors instead of more conventional indicators of academic achievement (Martínez et al., 2019). Lastly, it is demonstrated that favorable feelings about the study were associated with improved academic achievement using favorable correlations with their psychological capital (resilience, hope, optimism, and efficacy) (Carmona-Halty, Villegas-Robertson, et al., 2019; K. W. Luthans et al., 2019).

## *In Terms of Gender and Study Cycle*

Next, we discuss aspects related to sample characteristics, such as gender, insofar as significant differences were found between men and women regarding academic motivation, and cycle, insofar as significant differences were found between the different cycles regarding academic motivation and academic performance.

### Gender should continue in doctoral analyses and projections

V. Castro et al. (2011) developed an interesting study about resilience and emotional intelligence in female doctoral students, which invites us to value the importance of a gender perspective in the analysis of doctoral studies since this can offer significant findings in this field, especially if we take into account that the results of the present research support the existence of significant differences between men and women in academic motivation.

For instance, there is evidence that women are more likely than men to drop out of PhD programs in science, technology, engineering, or mathematics (STEM), which further diminishes the diversity of future specialists qualified for research and teaching roles in these domains. Therefore, measures are required to increase women in STEM's perseverance in completing their doctorates (Bekki et al., 2013), as previous studies have also found that, in terms of gender, women have been found to have greater emotional exhaustion and intentions to abandon the academic career (Hunter & Devine, 2016).

Another study relevant to this analysis used a phenomenological approach to analyze the self-efficacy of two African American women who earned doctoral degrees at a predominantly white institution in

the Midwestern United States. The findings of this study suggested that verbal persuasion and vicarious experiences were the strongest predictors of self-efficacy, as the two students attributed their success to the support of their peers, family, and professors and their involvement in welcoming communities (Dortch, 2016)

This is not a simple question. One study acknowledges that most diversity research within political methodology focuses on gender and overlooks racial and ethnic gaps, hence opening up a space to investigate how race/ethnicity and gender relate to doctoral students' methodological self-efficacy, as well as their overall academic self-efficacy (Smith et al., 2022).

A very recent study entitled *How to survive the doctorate? A meta-analysis of success in doctoral candidates* (Lozano-Blasco et al., 2024) found that permanence in the doctoral program depends on gender, age, and personal variables, with social support (family support, institutional support, and self-esteem) explaining 11% of permanence in the doctoral program. In this study, the model that best explained the permanence of the doctoral program was social support.

Finally, a study of biomedical doctoral students found that academic performance does not predict insertion into the main employment sectors. In contrast, gender showed significant differences in career paths. These findings question the influence of academic performance on access to various careers and highlight the need to adapt doctoral training to a broader spectrum of job opportunities while at the same time calling for further research into the gender aspects of doctoral training (Mathur et al., 2018).

### Study cycle and its relationship with academic motivation and performance

The present research found statistically significant results concerning motivation and academic performance in the study cycles. Other studies have also found significant differences, as reflected in the result that self-efficacy and optimism (elements of psychological capital strongly related to motivation) were higher among fifth-year students in all fields than among their first-year counterparts. (Mousavi Nasab & Nezhad, 2020). This result is similar to that found in the present study. It opens a space for research and design of specific strategies for dedication to study, organization of didactic resources, and contribution to academic activities, considering the year of study.

A revealing finding of our study was the evidence of a "motivational curve" reflected according to the progress of the study cycles, which passes through a high motivation in the first years, with an abrupt fall towards the third cycle of the career and then a progressive ascent until the end where academic motivation reaches its highest peak. This continues to open spaces for research and the design of specific motivational strategies considering the study cycle.

Another relevant aspect regarding motivation was found in the demotivation dimension, where 0% was found at the medium level. The fact that there is no middle level reveals that participants tend to be located at extremes of the motivational scale, either showing a low level of motivation (amotivation) or a high level of motivation; this psychological tendency of human behavior is important because it clearly shows two motivational profiles, and highlights the danger of amotivation, and how it radiates negatively to the other motivational spheres of the subject. Current studies show that demotivational causal attributions of success could be a characteristic of amotivation (Schormann et al., 2024), and that teacher motivation negatively influences teaching behavior (Coterón et al., 2024), while another study has shown that amotivation has direct and indirect effects on intention to drop out of school (Balkis, 2018).

This also has a positive side, and that is if it is possible to awaken some motivational spring in doctoral students, this would keep them away from the possibility of becoming unmotivated, for example, in the third cycle where the greatest drop in motivation has been found, motivational strategies can be promoted to help solve this situation, For this, it is recommended to work in specific areas of intrinsic and extrinsic motivation.

Another issue related to academic motivation, but little addressed, is the expectations of success, which can be favorable or unfavorable. In this regard, one study found that students' expectations of success and course values were important negative predictors of doctoral students' academic burnout and recommended that supervisors equip their doctoral supervisees with realistic expectations for professionals about the required course skills from the outset, develop the skills necessary to complete their respective doctoral programs, and periodically remind them of their program values in case they experience academic burnout (Sellali & El Houda Lahiouel, 2022)

## *Limitations and Future Projections*

Current doctoral programs face many challenges, among them promoting a balance between study and work. In this regard, a study has found that this balance can benefit the training process of the doctoral student and the professional experience, but only in the case that the current work tasks correspond to the thesis topic. The challenges of balancing study and work are highlighted (Bekova & Dzhafarova, 2019).

Another important challenge is associated with the holistic well-being of doctoral students. We have selected a study that attempts to expand on the existing literature on the concept of student burnout (Sellali & El Houda Lahiouel, 2022). We think that, in addition to this, more constructive ideas like academic motivation, psychological capital, and asset transfer must be expanded. We are confident that we can advance a positive doctoral education that makes "very happy people" by bringing out the best in people and enhancing their positive core (Bekova & Dzhafarova, 2019; Diener & Seligman, 2002; Seligman et al., 2009).

Future research should also look into the differences between PhD students who study in person and those who study virtually or online, particularly in programs that combine both modalities and bring students together in one location. According to one study, despite the growing number of PhD students pursuing distance learning, little is currently known about how distance learning works. Accounts of dissatisfied and lonely PhD students who are cut off from their communities of practice represent one extreme of the spectrum. However, the literature also provides examples of remote PhD students who are content to avoid being distracted by others and see themselves as agents and autonomous. This essay asks what makes a remote learner different from a traditional PhD student (Kozar et al., 2015). What would be the success factors of one or the other? Will aspects such as psychological capital and academic motivation be key in the academic performance of one or the other?

An interesting and peculiar study addresses the challenges and learning outcomes of educational design research (EDR) for doctoral students and found indications that the challenges of EDR may be related to the relatively new and minority position of EDR in the educational sciences and the role that an (early career) researcher must assume in EDR (Bronkhorst & de Kleijn, 2016).

In this regard, another significant study describes leadership self-efficacy in doctoral programs by examining the lived experiences and perspectives of doctoral supervisors. The findings revealed the interaction of five types of efficacies in this context: research self-efficacy related to supervisors, research self-efficacy related to students, leadership self-efficacy related to supervisors' roles, student self-efficacy related to students' roles, and collective efficacy. The main type of efficacy that made a difference in the context of doctoral studies and enabled supervisors to help their students reach their milestones while maintaining their mental health was Supervisors' Leadership Self-Efficacy. Effective supervisors found techniques to improve the level of their leadership self-efficacy, support their students, and enhance their sense of efficacy. However, the findings also suggest that supervisors experienced challenges in their roles and did not receive sufficient support, which may negatively influence their leadership self-efficacy and, in turn, affect the performance and well-being of doctoral students (Al Makhamreh & Kutsyuruba, 2020)

The quality of the supervisor-doctoral candidate relationship, the doctoral candidate's sense of belonging, freedom in the project, and working on a project closely related to the supervisor's research

were positively related to satisfaction and negatively related to intentions to leave the job. The high workload of doctoral candidates should be an important point of attention for universities wishing to increase their doctoral completion rates and the satisfaction of their candidates. In addition, the "match" between the PhD candidate and his or her supervisor is crucial, both personally (a good relationship) and academically, i.e., that the PhD candidate works on a topic closely related to the supervisor's research (van Rooij et al., 2021)

The concept of progress, its components, and its relationship to both emotional well-being and dropout need to be studied in more depth (Prieto et al., 2022), i.e., internal factors such as motivation, writing skills, self-regulatory strategies, and academic identity (Sverdlik et al., 2018) and knowledge on the design of doctoral interventions that focus on progress, relevant to doctoral trainers, institutions and researchers (Prieto et al., 2022).

A recent study conducted workshops with a preventive interventions approach combining research-backed education on mental health and productivity, peer exchange and discussion of experiences and indicators of progress, as well as "self-tracking" analysis and reflection on daily evidence of their progress, had a positive effect on the positive psychological capital of doctoral students (Prieto et al., 2022). This is encouraging and calls for moving beyond the diagnostic perspective to positive educational intervention in the classroom (Seligman et al., 2009).

As final considerations, key aspects for doctoral success are summarized, among them, the relationship between persistence and mental health (Shanachilubwa et al., 2023) by ensuring that this persistence motivation (Zhou, 2014), to be an inspirational motivator, with a positive impact on performance (Muthimi et al., 2021) and well-being of doctoral students.

Doctoral students should be aware of challenges such as finding time for family and social life and lacking support from colleagues and their institution (de Jager et al., 2018). This awareness can inform institutional policies and practices that promote a more favorable environment for doctoral students' academic and personal success, thus enhancing their experience and trajectory in the doctoral program. It also allows reflection on personal resources to achieve support from peers, family, and professors, and participation in welcoming communities is are key element attributed to doctoral success (Dortch, 2016).

In line with the above, it is necessary to promote a positive doctoral education that achieves "very happy people" (Diener & Seligman, 2002; Seligman et al., 2009), with the compass of eudaemonic well-being, as a vision of human happiness that occurs when one feels intensely involved, specially adapted to activity and intensely alive, related to maximum experiences of interest, motivation, and joy (Ilies et al., 2005). To this end, it is important to facilitate social connection, encourage and emphasize students' well-being over their productivity (Syropoulos et al., 2021), reinforcing the doctoral students' high hopes, dreams, and possibilities (Woolston & O'Meara, 2019).

At the same time, it is important to take into account that the doctorate is a disruptive stage where many stressful situations are faced. It is important to develop factors such as resilience and optimism (Gómez Molinero et al., 2018) as well as self-perception of doctoral progress and persistence (Prieto et al., 2022), but taking care to avoid student overload and burnout which is more likely with realistic expectations (Sellali & El Houda Lahiouel, 2022).

It is necessary to rethink self-efficacy as a key element of the doctorate (Dortch, 2016), understand the behavior of the "motivational curve" in doctoral students, and continue to explore the possibilities and dangers of introjected regulation, as it is associated with positive aspects of academic performance but also with negative aspects of mental health. It is also necessary to continue to examine other mediating factors, such as the relationship between intrinsic regulation and organization of teaching resources, organization of teaching resources and self-efficacy, and dedication to study and resilience.

Finally, we would like to highlight the positive value of psychological capital, based on the evidence of its significant positive relationship with performance and satisfaction (F. Luthans et al., 2007), arguing that PsyCap plays a key role in behaviors that lead to higher levels of academic achievement (Chaffin et al., 2023). Further deepening of the supportive climate in the doctoral classroom is encouraged (Slåtten et al., 2021), and the mediating and predictive role of psychological capital (Carmona-Halty, Salanova, et al., 2021; Carmona-Halty, Schaufeli, et al., 2019; Carmona-Halty, Villegas-Robertson, et al., 2019; K. W. Luthans et al., 2019; Martínez et al., 2019; Slåtten et al., 2021), the importance of continuing to incorporate gender analysis, also linked to issues such as race and ethnicity, is highlighted as a significant element (Smith et al., 2022), Finally, it is felt that further studies on the academic motivation and performance of doctoral students in the different years of their doctoral career will help to have a more holistic view of doctoral success.

## *Strategies and Policies to Enhance the Doctoral Student Experience*

To optimize the doctoral student experience and academic success, several evidence-based strategies and policies should be implemented:

1. **Promoting Self-Efficacy and Academic Motivation**
   - Encourage structured academic support, such as mentoring programs and research training, to enhance students' self-efficacy (Cheng et al., 2019; Woo et al., 2023).
   - Implement interventions that strengthen Psychological Capital (PsyCap), as it has been shown to positively influence academic achievement, motivation, and persistence (Chaffin et al., 2023; F. Luthans et al., 2007).
   - Design motivational strategies that address the "motivational curve" observed in doctoral students, particularly mitigating motivation declines in mid-program stages (Kotera et al., 2023).

2. **Balancing Study Dedication and Resilience**
   - Establish policies that prevent excessive academic workload, as extreme study dedication has been found to negatively impact resilience and well-being (McKenzie et al., 2022; Zulfikar, 2022).
   - Encourage self-care strategies, stress management programs, and social support networks to foster resilience and prevent burnout (Morales, 2008; Prieto et al., 2022).
   - Implement flexible work-study policies to support students in balancing academic demands with professional and personal responsibilities (Bekova & Dzhafarova, 2019).

3. **Enhancing Doctoral Supervision and Institutional Support**
   - Strengthen the doctoral supervisor-student relationship by promoting leadership self-efficacy in supervisors, which directly impacts student success and mental health (Al Makhamreh & Kutsyuruba, 2020).
   - Foster inclusive and supportive academic environments that consider gender, ethnicity, and other diversity factors in doctoral education (Lozano-Blasco et al., 2024; Smith et al., 2022).
   - Develop interventions that enhance students' perception of the research training environment, as this moderates the relationship between research self-efficacy and research productivity (Woo et al., 2023).

4. **Integrating Positive Psychology in Doctoral Education**
   - Shift towards a doctoral education model centered on eudaimonic well-being, prioritizing personal growth, motivation, happiness, and academic enjoyment over mere productivity (Diener & Seligman, 2002; Ilies et al., 2005).

- Encourage social connection and peer support networks, as these factors have been linked to doctoral success and persistence (Dortch, 2016; Woolston & O'Meara, 2019).
- Implement psychological and emotional interventions to increase academic motivation, given its role as a predictor of performance and engagement (Coromina et al., 2011; Nawa & Yamagishi, 2021).

To effectively support doctoral students through the fluctuations of their motivational journey, it is essential to design specific strategies that correspond to each stage of the motivational curve. In the early phase, institutions can harness students' initial enthusiasm by offering structured student welcome programs, thesis mentoring opportunities, mentoring on scientific publications, and goal-setting workshops that channel this energy into productive academic planning.

During the middle phase-where motivation often wanes due to academic pressure, uncertainty, and emotional fatigue-interventions should focus on mental health support, peer networking, flexible timelines to avoid burnout and reduce dropout, and celebrating students' achievements and progress.

Finally, to maintain and elevate motivation in later stages, universities can promote visibility of student achievements, provide support for publication and conference participation, and facilitate internationalization initiatives. Aligning institutional policies with these motivational stages ensures a more supportive, resilient, and successful doctoral experience.

By implementing these strategies, institutions can create a more supportive and effective doctoral education framework that enhances student well-being, academic performance, and long-term research engagement.

## CONCLUSIONS

The psychological dynamics that influence the academic performance of doctoral students reveal the importance of psychological capital and academic motivation, with a particular emphasis on introjected motivation, resilience, and self-efficacy. In addition, the identification of a motivational curve in doctoral students highlights the need for specific interventions to mitigate motivational drops in the intermediate stages of the program (where the highest attrition rates occur). The findings underscore the urgency of strategies that strengthen these factors, promoting a balance between academic demand and personal well-being. In this sense, effective supervision, institutional support policies, and the integration of positive psychology approaches are positioned as key elements to optimize the doctoral experience and prevent burnout and demotivation.

Beyond academic performance, doctoral education should adopt an approach based on eudaimonic well-being, which transcends the attainment of the degree and fosters the personal and professional development of students. In this context, doctoral happiness is achieved through engagement, adaptability, and a clear purpose, promoting experiences of motivation and satisfaction throughout the process. This study highlights the importance of designing doctoral programs that maximize academic performance and foster an environment of integral training, favoring the development of resilient researchers who are motivated and fully committed to their academic and professional trajectory.

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