

Gender and academic performance: key variables in the motivation of Baccalaureate students and their choice of modality

Género y rendimiento académico: variables clave en la motivación del alumnado de Bachillerato y su elección de modalidad

Гендер и академическая успеваемость: ключевые переменные в мотивации студентов бакалавриата и выборе ими академической траектории

性别和学业成绩:关于高中生动机及其学业选择方式的关键变量

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Abstract

Introduction: The Baccalaureate represents a pivotal juncture in the academic journey of Secondary Education students, marking a significant moment for them to select their study path. Such decisions hold substantial sway over their academic trajectory and future professional endeavors. This study endeavors to delve into the intricate fabric of internal and external motivations influencing Baccalaureate students in their choice of study modality, with a particular focus on two key variables: gender and academic performance.

Method: To conduct this exploratory study, we engaged a sample of 233 students and administered a bespoke quantitative questionnaire crafted specifically for this purpose, drawing inspiration from an established questionnaire.

Results: The conducted tests reveal statistical significance concerning external motivations, indicating that students exhibit significantly higher scores in external motivations across both analyzed study modalities, albeit with subtle variations. Notably, no significant discrepancies were found regarding gender. Regarding academic performance, although no significant differences emerged, there existed a trend among high-performing students in humanities and social sciences to exhibit elevated levels of internal motivations.

Conclusions: The discussion of results underscores the originality of this research, as opposed to the predominant focus in existing studies on gender disparities or academic performance alone, without delving into the nuanced landscape of influential motivations.

Keywords: science, social sciences, gender, motivation, academic performance.

Resumen

Introducción: El Bachillerato es una etapa fundamental en la toma de decisiones académicas de los y las estudiantes de Educación Secundaria para elegir una modalidad de estudios. Estas decisiones marcan el futuro académico y profesional. El presente estudio tiene como objetivo analizar las motivaciones internas y externas del alumnado de Bachillerato en su elección de modalidad, según dos variables: género y rendimiento académico.

Método: Para realizar este estudio exploratorio, se ha trabajado con una muestra de 233 estudiantes, aplicando un cuestionario cuantitativo elaborado *ad hoc*, basado en otro ya existente.

Resultados: Las pruebas aplicadas muestran significatividad estadística para las motivaciones externas, de modo que se puede afirmar que el alumnado puntúa significativamente más alto en las motivaciones externas, con matices, en las dos modalidades de estudio analizadas. No se aprecian diferencias significativas en relación con el género. Para el rendimiento académico, aunque tampoco se aprecian diferencias significativas, se observa una tendencia en el alumnado de humanidades y ciencias sociales de rendimiento académico alto para puntuar más altas las motivaciones internas.

Conclusiones: La discusión de resultados muestra la originalidad de este trabajo, ya que, la mayoría de estudio se centran en las diferencias de género o rendimiento académico, sin analizar el tipo de motivaciones influyente.

Palabras clave: ciencias, ciencias sociales, género, motivación, rendimiento académico.

Аннотация

Введение: Бакалавриат является основополагающим этапом в процессе принятия решений учащимися средней школы о выборе курса обучения. Эти решения определяют их академическое и профессиональное будущее. Цель данного исследования - проанализировать внутренние и внешние мотивы студентов бакалавриата при выборе способа обучения в зависимости от двух переменных: пола и академической успеваемости.

Метод: Для проведения данного исследования мы работали с выборкой из 233 студентов, применяя количественную анкету, разработанную ситуативно, на основе другой существующей анкеты.

Результаты: проведенные тесты показали статистическую значимость для внешних мотивов, поэтому можно утверждать, что студенты показывают значительно более высокие результаты по внешним мотивам, с учетом нюансов, в двух анализируемых режимах обучения. Значительных различий в зависимости от пола не обнаружено. Что касается академической успеваемости, то, несмотря на отсутствие значимых различий, наблюдается тенденция к тому, что студенты гуманитарных и социальных наук с высокой академической успеваемостью показывают более высокие результаты по внутренним мотивам.

Выводы: Обсуждение результатов показывает оригинальность данной работы, поскольку большинство исследований сосредоточены на гендерных различиях или академической успеваемости, без анализа типа влияющих мотивов.

Ключевые слова: наука, общественные науки, гендер, мотивация, академическая успеваемость

概要

简介: 高中是中学期间学生选择学习类型的学业决策的一个重要阶段。这些决定关系其学业和职业的未来。本研究的目的是根据性别和学业成绩两个变量来分析高中阶段学生选择模式的内部和外部动机。

方法: 为了开展这项探索性研究,我们对 233 名学生进行了抽样调查,并应用了一份基于现有调查问卷而临时准备的定量调查问卷。

结果: 所应用的测试显示了外部动机的统计显著性,因此可以说,在分析的两种学习模式中,学生在外部动机方面的得分显著较高,但存在细微差别。与性别相关,没有显著差异。就学业成绩而言,虽然没有看到显著差异,但在学业成绩高的人文社会科学学生中,观察到内在动机得分较高的趋势。

结论: 结果的讨论显示了本研究的原创性,因为大多数研究关注性别差异或学业表现,而没有分析影响动机的类型。

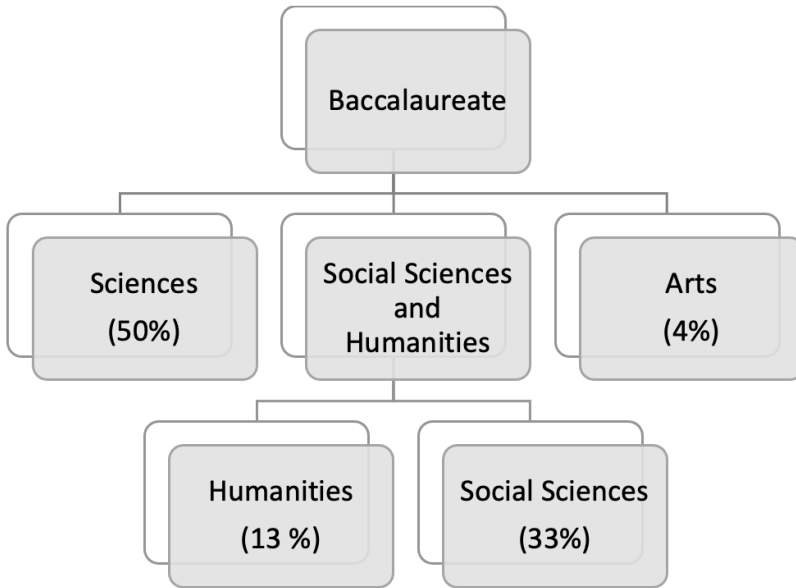
关键词: 科学、社会科学、性别、动机、学业成绩。

Introduction

Motivating students to engage with learning tasks stands as a paramount challenge for educators. The success of any teaching-learning endeavor hinges significantly on this motivation (Baños et al., 2017; Trigueros & Navarro, 2019). Various factors influence students' inclination to embrace a subject (Rodríguez et al., 2016), shaped by the academic phase, the specific subjects under study, and perceptions of the utility and practical application of competencies (Domínguez-Alonso et al., 2016; Escamilla-Fajardo et al., 2020). This study delves into a context where motivational factors hold a distinct prominence: the Baccalaureate stage (Gaxiola & Armenta, 2016; Rodríguez-Muñiz et al., 2019). Here, students confront choices among different academic pathways, with outcomes revealing considerable disparities, as evidenced by enrollment statistics in the Baccalaureate Assessment for University Access (EBAU), conducted at the stage's culmination. Figure 1 illustrates these findings.

Figure 1

Distribution of percentages of choice of study modality at the EBAU at the national level (academic year 2020/2021)



This study delves into analyzing gender variables (Martínez et al., 2015; Navarro & Casero, 2012; Rodríguez et al., 2006) and students' academic performance (Corrales et al., 2021; Martínez et al., 2015), recognizing their significant impact within the scientific literature exploring factors influencing modality choice.

Traditionally, research on this matter has concentrated on the distribution of students across various study modalities and how these variables interplay (González-Benito et al., 2021). However, our focus extends to examining the underlying motivations, both internal and external, driving these choices. By doing so, we aim to ascertain whether discrepancies observed in study choices based on gender and academic performance are contingent upon differing motivational factors.

Understanding the influence of these variables on Baccalaureate study modality selection holds paramount importance, given the notable imbalance evident in the percentages of modalities chosen. This imbalance carries multifaceted implications, encompassing academic, organizational, pedagogical, and didactic realms (Corrales et al., 2021; Domínguez-Alonso et al., 2017). Moreover, this relevance amplifies when considering that modality selection significantly shapes subsequent career choices and professional trajectories (Renger et al., 2020).

Internal and external motivations

There exist numerous interpretations of the concept of motivation. The classical definition portrays it as a state wherein an individual propels themselves toward a specific objective:

Motivation is the process through which thoughts, beliefs, and emotions coalesce to drive action toward a defined goal. It is the mechanism by which purposeful activity is initiated and sustained. (Pintrich et al., 2006, p. 6)

This conventional definition is enriched by some scholars (Morata et al., 2019), who incorporate affective components alongside cognitive ones.

Academic motivation is depicted as a holistic process wherein behavior is triggered and directed toward achieving an academic or learning goal. This process encompasses both cognitive and affective variables. Cognitive aspects include critical thinking skills and instrumental behaviors aimed at goal attainment, while affective elements involve self-assessment and self-concept. (Gil-Lopez et al., 2019, p.12)

Among the various motivators pertinent to learning, Bolarin et al. (2015) emphasize the pivotal role of the teacher and classroom environment.

In light of this, it's essential to underscore motivation's dual dimensions: an initiating phase wherein an individual's will is directed toward action, and a sustaining dimension that enables continued effort toward task completion (Salgado et al., 2017), which Marina (2013) categorizes as Initial Motivation and Task Motivation.

Considering the origins of motivation, scientific literature delineates two typologies: internal motivation and external motivation (Ryan & Deci, 2020; Locke & Schattke, 2019; Serin, 2018).

- *Internal motivation* stems from inherent interest in the goal itself.
- *External motivation* arises from external incentives rather than the goal itself.

Analyzing this dichotomy sheds light on the roots of motivational processes and potential avenues for transforming these motivations (Ng, 2018). Some studies highlight the nexus between internal motivation and goal orientations, self-efficacy, and self-concept (Clinkenbeard, 2012), elucidating how fostering internal motivation can, in turn, enhance academic performance associated with these constructs.

The variables of gender and academic performance and motivation to choose a modality of study

Various factors influence motivational processes, with some studies highlighting external variables like career prospects, access to socioeconomic status, or societal perceptions (Llanes-Ordóñez et al., 2021; Diseth et al., 2020; Liu, 2020). Interestingly, Baccalaureate students exhibit a stronger inclination toward scientific-technical subjects in light of these external motivations (Corrales, 2020).

Conversely, internal factors such as personal preferences, vocational aspirations, and individual inclinations also significantly impact motivational dynamics (Bosch et al., 2019; Eckes et al., 2018; Kunanithaworn et al., 2018; Gómez-Gómez, 2021), showing connections across all study modalities (Garrocho, 2022).

This study aims to delve into the role of gender and academic performance concerning these motivational factors and their influence on Baccalaureate modality choice.

Regarding gender, Quattrocchi et al. (2017) argue its profound influence, with studies suggesting gender-based preferences for STEM (Science, Technology, Engineering, and Mathematics) disciplines (Makarova et al., 2019) or education-related higher education choices (Renger et al., 2020).

In terms of academic performance, Leontiev et al. (2020) link factors like self-esteem and self-efficacy to performance, with clear correlations to study motivation (Gil-López et al., 2019). Additionally, Vázquez et al. (2013) relate academic performance to learning styles, while D'Alessio et al. (2019) highlight critical thinking as another key determinant.

This research seeks answers to the following questions, interlinking gender, academic performance, and motivation categorized as external or internal:

- Does gender influence the type of motivation guiding study choices?
- Does academic performance shape the type of motivation driving modality selection?

Research Objectives and Hypotheses

The primary aim of this study is to examine how internal and external motivations influence Baccalaureate students' choice of study modality, considering gender and academic performance variables. This overarching goal is broken down into three specific objectives:

- SO1: To provide a descriptive analysis of the study sample, presenting data related to gender and academic performance variables.
- SO2: To conduct inferential analysis to ascertain the impact of internal and external motivations on Baccalaureate students' modality choices.
- SO3: To perform inferential analysis investigating the influence of variables such as gender and academic performance on students' assessment of internal and external motivations regarding modality choice.

Concerning SO3, the research employs the following working hypotheses:

- H1: Baccaulaureate students' scoring of internal and external motivational factors does not vary based on gender.
- H2: Baccaulaureate students' scoring of internal and external motivational factors does not differ based on academic performance.

Methodology

Sampling and data collection

The sample comprised n=233 participants, with 137 (58%) being female and 96 (41%) male. All respondents voluntarily, individually, and anonymously completed the questionnaire. Data collection adhered to research ethics protocols as regulated by the University of Extremadura (2013).

This convenience sample was non-probabilistically selected, given the exploratory nature of the study, with plans for expansion akin to previous research (Dávila et al., 2021). Selection criteria ensured:

- Inclusion of students from both years of Baccaulaureate.
- Representation of various Baccaulaureate modalities among participants.

During data collection, participants were duly informed of the anonymous data transfer for research purposes through an established informed consent model. The research outcomes will be disseminated through similar means, involving volunteers in the research conclusions.

Characteristics of the sample

The members of the sample are students in the first and second year of Baccaulaureate. Table 1 shows its main characteristics.

Table 1

Summary of the main characteristics of the sample

Factor	Variable	Result
Gender	Male	48%
	Female	52%
Age	16 years old	53%
	17 years old	29%
	18 years old	13%
	>18 years old	5%
Downtown Location	Rural	42%
	Urban	58%

Factor	Variable	Result
Modality of studies	Sciences	54%
	Humanities/Social Sciences	46%
Average grade	Approved	19%
	Notable	54%
	Outstanding	27%

Instrument

Questionnaire design

The data collection instrument utilized in this study is a questionnaire adapted from the Didactic Innovation Group *Ética del Profesorado Universitario*. This preliminary questionnaire, grounded in the scientific literature on the topic, has examined internal and external motivations within teaching-learning processes (Hortal, 2002; Martínez-Navarro, 2017). The questionnaire underwent several modifications for this study:

- Tailored to suit participants in a pre-university stage.
- Adjusted terminology to suit the sample.
- Introduced specific Baccalaureate-related issues, such as the choice between modalities.

The questionnaire is divided into two blocks: The first block addresses sociodemographic factors (Table 2), including variables like gender, age, school location, type of study, and average grade from the previous stage. The second block (Table 3) contains criteria reflecting internal and external motivations, aligning with the distinctions outlined in the introduction to this study. These questions utilize a Likert-type scale from 1 to 10, where 1 signifies “I don’t agree at all” and 10 signifies “I totally agree” with the statement provided. These 21 criteria respond to the statement: “criteria that I consider when choosing a Baccalaureate modality.” The items in this section are presented in random order, combining internal and external motivations. This questionnaire builds upon previous research conducted by the research team in both university and secondary education settings (Corrales et al., 2020).

Table 2

Questions from the first block of the questionnaire and response variables

Question	Response Variables
Gender	Male or female
Age	16 years old
	17 years old
	18 years old
	19 years old

Question	Response Variables
Downtown Location	Rural Urban center Urban suburbs
Modality of studies	Sciences Humanities and Social Sciences Arts
Average grade of the previous stage	5-6 7-8 9-10

Table 3

Internal and external motivation criteria used in the questionnaire in the order in which the questionnaire presents them

tags. Order No.	Motivation	Typology (Internal or External)
Q1	I want to enter a profession that is compatible with my values.	Internal
Q2	The profession I will be able to access is well paid.	External
Q3	These studies have many career opportunities.	External
Q4	I want to have a profession with social utility.	External
Q5	These are studies for which I have the skills and attitudes.	Internal
Q6	The profession I aspire to can bring me an adequate social and economic level.	External
Q7	I want to access a degree that allows me to do other studies.	External
Q8	The profession I want to enter allows me to help others.	Internal
Q9	Studying helps me to be a better person.	Internal
Q10	I aspire to a profession for which I feel a calling.	Internal
Q11	It allows me to access a profession for which I feel a vocation	Internal
Q12	I can succeed studying this modality.	External
Q13	I don't want to waste my GPA.	External
Q14	I believe that my work will be related to the modality I study.	Internal
Q15	There is no relationship between the modality I study and the job I would like to have	External
Q16	I'm attracted to the type of organization I want to work in.	Internal

<i>tags.</i> Order No.	Motivation	Typology (Internal or External)
Q17	The profession for which these studies prepare me is well regarded by society	External
Q18	The profession for which these studies prepare me is creative	Internal
Q19	Family tradition has weighed on my decision to study this modality	External
Q20	My average grade does not allow me to aspire to the degree I really wanted	External
Q21	Studying allows me to help others	Internal

Instrument Validation

Once formulated, the questionnaire underwent a validation process comprising three phases:

- Validation by 12 experts who teach at the Baccalaureate level, who proposed modifications to enhance question clarity and comprehension. These modifications primarily addressed language and approach adjustments, all considered for optimization.
- Testing by 32 high school students to assess question understanding and response time.
- Subsequent to expert validation, data collection commenced. Upon obtaining all records, internal coherence and reliability were evaluated by calculating Cronbach's alpha. This statistic measures the level of correlation between variables and their alignment with the measurement scale (in this case, a Likert type scale). The overall Cronbach's alpha value was $\alpha = .788$, a level typically considered valid in the social sciences field, with values close to $\alpha = .700$ generally accepted, and from $\alpha = .600$ in educational studies (Lai, Hsiao, & Hsieh, 2018).

Data analysis

This research is exploratory and quantitative. The data has been analyzed with SPSS v. 25 software for Windows (2020) and eventually with JASP 0.16.3.0 (2020). The study variables were, therefore, the qualitative variables of gender (Male/Female), academic performance through grade (5-6/7-8/9-10) and modality of studies (humanities and social sciences/sciences); and the quantitative internal motivation score (0-100, continuous) and external motivation score (0-100, continuous).

Results

Descriptive results

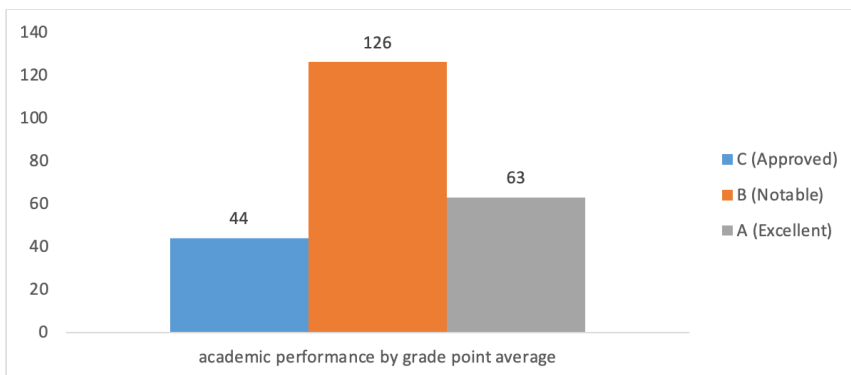
Firstly, with regard to Objective SO1, this section presents results pertaining to the specific characteristics of the sample, particularly focusing on descriptive variables such as gender and academic performance.

Regarding the distribution of students across different Baccalaureate modalities, 54% (126) of students are enrolled in the science modality, while 46% (107) are enrolled in the humanities and social sciences modality. Notably, data from the humanities and social sciences modality are amalgamated from both itineraries. This balanced distribution slightly shifts when considering modality choice in relation to gender within the sample. The science modality is predominantly pursued by males, with 70 men (59%) compared to 48 women (41%), whereas the humanities and social sciences modality sees a higher enrollment of females, with 66 women (57%) compared to 50 men (43%).

Additionally, academic performance, assessed through average grades, holds significance in this research. It influences students' motivation to select a specific study modality or opt out of certain modalities due to perceived difficulty. Regarding academic performance, participants in the study achieved outstanding grades in 27% (63) of cases, notable grades in 54% (126), and passing grades in 19% (44). The sample exhibits a distribution where notable grades predominate, with passing grades being the least frequent option, as depicted in Figure 2.

Figure 2

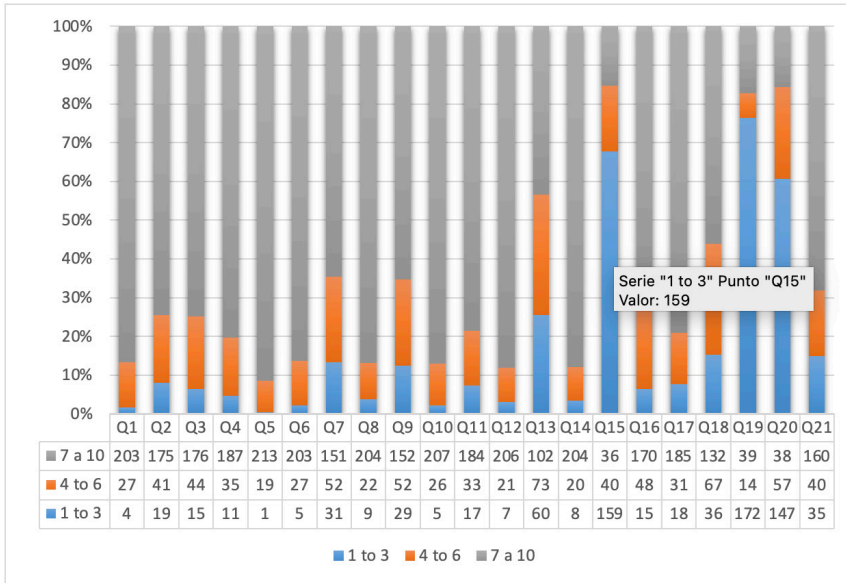
Distribution of the sample by average grades of ESO to observe the academic performance of the students in the sample



In addition, the information that refers to the scores with which the students have chosen the items of the questionnaire is included, Figure 3 shows the distribution in three ranges: 1-3, 4-6, 7-10.

Figure 3

Distribution of scores according to ranges 1-3, 4-6, 7-10



All this analysis serves to respond to SO1: "To descriptively analyze the sample under study to expose the data related to the variables of gender and academic performance."

Inferential results

To validate or refute the research hypotheses (H1 and H2), an inferential analysis of the gathered data has been conducted. The overarching goal of the statistical analysis is to ascertain significant differences ($p\text{-value} < .05$, $\alpha > 95\%$) based on the aforementioned variables.

Prior to analysis, the data underwent a normality assessment using the Kolmogorov-Smirnov test for samples exceeding 50. The outcomes of this analysis are delineated in Table 4.

As can be seen in Table 4, the series of data corresponding to the scores in internal motivation do not conform to normality, so the inferential analyses have been carried out using non-parametric statistical tests.

Table 4*Descriptive statistics and test of normality in quantitative variables*

Variable	Statistical	Value
INTERNAL Motivation Score	Stocking	77.52 ± .888
	Median	80.90
	Variance	185.50
	Standard deviation	13.61
	Minimal	26.36
	Maximum	100
	p-valor Kolmogorov-Smirnov	< .001
EXTERNAL Motivation Score	Stocking	58.38 ± .828
	Median	59.00
	Variance	16118
	Standard deviation	12.69
	Minimal	10.00
	Maximum	86.00
	p-valor Kolmogorov-Smirnov	< .002

Analysis of the influence of modality on predominant motivation

Now, let's delve into the analysis of the data concerning SO2. Traditionally, motivations underlying the selection of a humanities and social sciences track in studies tend to be more closely associated with factors of personal vocation and, ultimately, of an internal nature. Hence, it's pertinent to analyze the available data from this perspective.

Given the non-normal distribution of the data, the Mann-Whitney U test is employed to compare the two sets of motivation across the modality variable, which assumes two nominal values: sciences or humanities and social sciences. The results reveal no significance in inferential analysis regarding internal motivation; however, external motivation exhibits notable differences based on the type of study. The p-value of the Mann-Whitney U test for Internal Motivation is .333, whereas for External Motivation, it stands at .007. Thus, it can be statistically concluded that the study modality variable does not significantly impact the score attained in internal motivation within the researched sample. However, it does influence external motivation, with average scores being higher for students pursuing science studies. This is graphically depicted in Figure 4.

Figure 4

Pyramid of frequencies for the score in External Motivation (EXT, vertical axis) according to modality sciences or humanities and social sciences

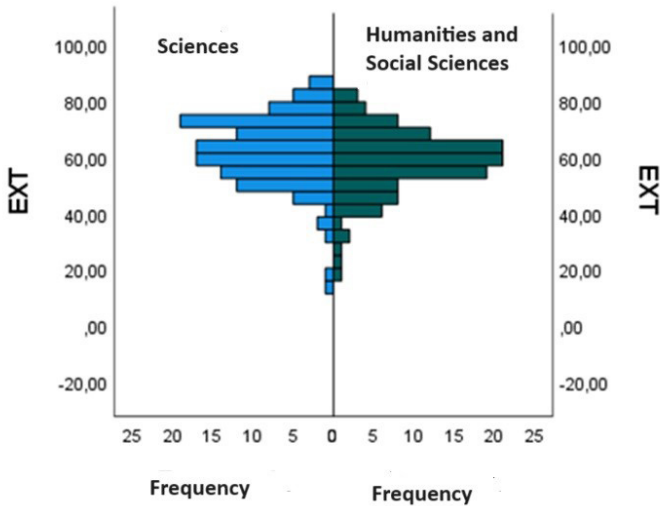


Figure 4 illustrates that high scores in external motivation are more prevalent among science students, whereas those in the humanities and social sciences track tend to achieve lower values.

Comparing the means obtained in both groups, Table 5 indicates a higher average score for external motivation among science students (69.35 points) compared to humanities and social sciences students (64.02 points). Conversely, the difference is less pronounced when considering internal motivation scores (77.15 versus 76.48, respectively).

Table 5

Averages obtained in each of the study modalities

Target Variable	Orientation	Stocking
Internal motivation	Sciences	77.15
	Humanities and Social Sciences	76.48
External motivation	Sciences	69.35
	Humanities and Social Sciences	64.02

Statistical analysis reveals a significant difference in external motivation, indicating that students pursuing science-oriented tracks tend to score notably higher in this regard. This finding affirms the inference posed by SO2, which seeks to assess the influence of internal and external motivations on students' choice of Baccalaureate modality. Interestingly, the analysis demonstrates no significant disparity between the internal and external motivations selected by students in the sample.

Analysis of the influence of the gender variable on the predominant type of motivation

The subsequent phase involves analyzing the data concerning SO3 to either corroborate or challenge H1. One aspect under scrutiny is the potential impact of participants' gender on their assessment of internal and external motivation criteria. To address this inquiry, we conducted an analysis of the independent variables of internal and external motivation concerning both male and female genders.

Given that the distribution of the quantitative series (scores in internal and external motivation) remains non-normal, we employed the Mann-Whitney U test to discern significant differences based on gender, mirroring the approach taken with modality comparison.

However, the comparison of distributions in both cases did not yield any significant results. The p-values of the test failed to reach the threshold of significance, with values of .61 for internal motivation scores and .47 for external motivation scores. This suggests that no statistically significant differences exist in the scores between men and women within the research sample. Table 6 displays the average values for both categories, indicating minimal divergence between them.

Table 6

Mann Whitney U test result for independent samples

Target Variable	Gender	Stocking	p-Value
Internal motivation	Man	69.68	.61
	Woman	69.36	
External motivation	Man	74.98	.47
	Woman	73.35	

As evident from the results, statistical significance is not attained in either case (p-value > .05), indicating an inability to discern a different mean in internal or external motivation scores based on gender. Put simply, the mean scores obtained from both male and female groups within the sample are indistinguishable. This outcome confirms H1 and addresses the initial aspect of SO3, which seeks to assess the impact of variables such as gender or academic performance on students' evaluation of internal and external motivations in their choice of modality. Thus, it concludes that there exists no significant disparity between the scores provided by male and female participants in this study regarding various types of motivation.

Analysis of the influence of students' academic performance

To conclude the analysis, data pertaining to SO3 is examined to either confirm or refute H2. Another variable under consideration in this study is academic performance, categorized into three groups ranging from 5-6 to 9-10. Given the presence of three mark categories (5-6, 7-8, and 9-10), the appropriate non-parametric analysis employed is the Kruskal-Wallis test. Table 7 displays the outcomes of this test applied to both the internal motivation score and external motivation score variables. As observed, statistical significance is not attained in any instance.

Table 7

Summary of values of the Kruskal-Wallis test (K-W) for the internal motivation score and external motivation score variables according to the categories of the Academic Performance variable.

	K-W Statistician	p-valor of K-W
Internal Motivation Score	.306	.858
External Motivation Score	1.099	.577

There is, therefore, no difference in the character of the motivation of high and low achieving students.

Inter-modality performance

In conclusion, addressing H2 involves exploring how students' academic performance relates to their motivations within segregated modalities. Put simply, it aims to ascertain whether students achieving higher academic grades within their respective modalities exhibit specific tendencies in their motivations for study selection. It's plausible that those with stellar academic performance may be propelled by internal motivations, whereas those with lower academic performance may be driven by external factors.

To investigate this, an inferential analysis utilizing the Kruskal-Wallis test (given the non-normality of the data) was conducted on segregated samples based on the type of studies chosen. Academic performance was compared with the final scores in both internal and external motivations among students opting for science and humanities/social sciences tracks.

The sample was divided into two broad groups: science and humanities/social sciences. For the latter, results revealed minimal statistical significance, with a p-value exceeding .05, as depicted in Table 8. This indicates no significant relationship between variables. In other words, the academic performance of students selecting the humanities and social sciences modality does not impact the scores they achieve in either internal or external motivation for their choice of studies. Regardless of academic performance, the sample exhibits consistent tendencies in scoring internal and external motivations.

Table 8

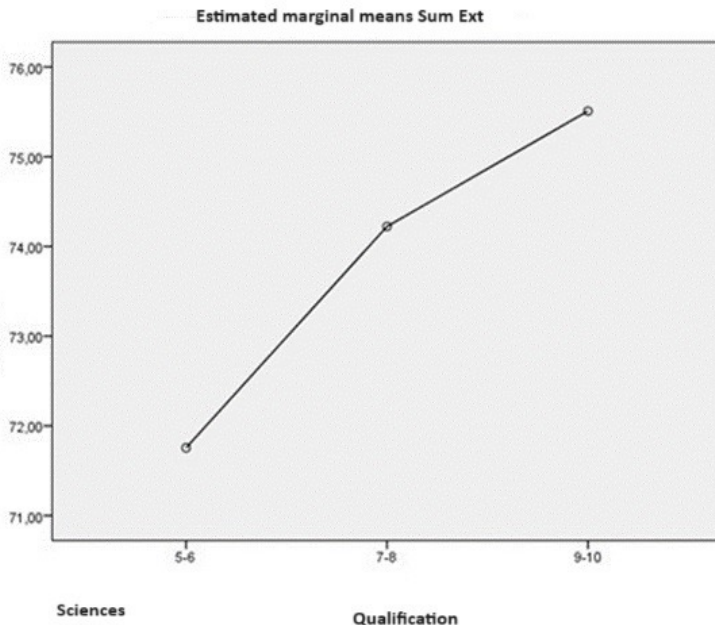
Results of the Kruskal-Wallis test in the sample segregated by study option (social sciences / sciences)

Students from		K-W Statistician	p-Value
Humanities Social Sciences	Internal Motivation Score	1.101	.577
	External Motivation Score	.612	.736
Science Students	Internal Motivation Score	.147	.929
	External Motivation Score	.070	.966

Similarly, for students in the science modality, the findings echo those of the previous scenario. Academic performance fails to elucidate a discernible tendency towards either internal or external motivations. Nevertheless, an observable trend emerges when examining the graphs illustrating the estimated marginal means in the distribution of scores for external motivation criteria. This trend is evident in Figures 5 and 6, where students assign higher ratings to external motivation criteria as their academic performance improves.

Figure 5

Graphic evolution of the assessment of external motivations according to the academic performance of science students



Certainly, we cannot claim statistical significance as Spearman's correlation coefficients for both the regression Academic Performance-External Motivation Score and Academic Performance-Internal Motivation Score fail to reach significance (p-values consistently greater than .05). However, a discernible trend does emerge.

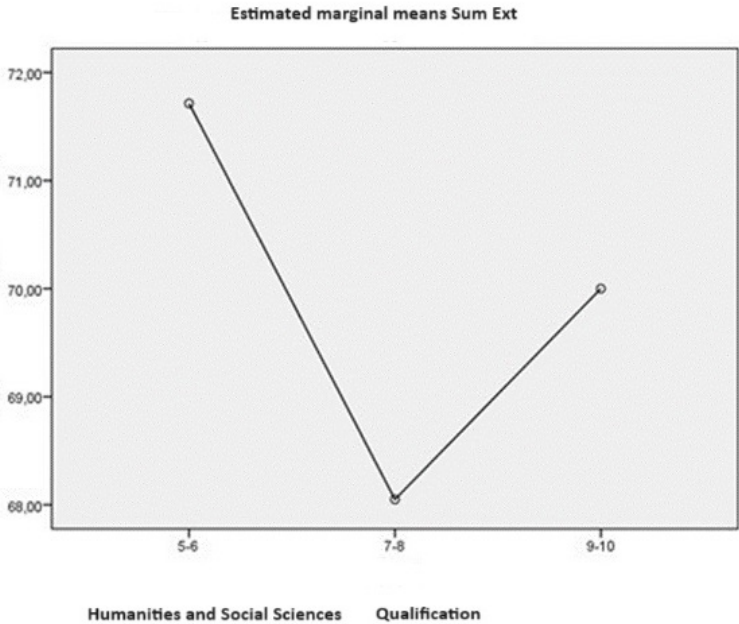
No other significant differences were observed among modality groups (sciences or humanities and social sciences) or segments of academic performance related to the average grades of the sample population. Despite lacking statistical significance, the graph in Figure 5 depicting humanities and social sciences students markedly differs from the one observed for science students in Figure 6, suggesting a potential trend. Although not statistically significant, this observation remains noteworthy for this study.

In light of these findings, H2 is confirmed, addressing the second part of SO3: "inferentially analyze the incidence of variables such as the academic performance of the students in the sample in their assessment of internal and external motivations

in the choice of modality,” concluding that there are no significant differences in the incidence of internal and external motivations depending on academic performance.

Figure 6

Graphic evolution of the assessment of external motivations according to the academic performance of social sciences students



Discussion and conclusions

The tests applied to the data collected through the research instrument have provided insights aligned with the specific research objectives. These findings are detailed below and contextualized within the broader landscape of similar studies.

In relation to SO1, the sample exhibits a normal distribution concerning gender and academic performance. This conclusion serves as a foundation for further exploration, allowing for research on the impact of internal and external motivations on both variables.

Regarding SO2, no significant differences were observed in the scores obtained for internal and external motivation items within the sample. Thus, it can be inferred that, overall, students in this study similarly value criteria associated with both types of motivation. Building upon this, we examined the influence of these motivations, considering gender and academic performance variables. Corrales et al. (2021) support these findings, suggesting that gender and academic performance do not significantly differ concerning internal and external motivation criteria.

Regarding the conclusions drawn from the gender variable (SO3/H1), this study concludes that, within the analyzed sample, no significant differences were observed in

the scores obtained for internal and external motivation items based on gender. While many comparative studies explore gender disparities in career or study modality choice, they often lack statistical significance or focus more on the choice of studies rather than the underlying motivations driving such choices.

Contrary to the results of this study, Navarro-Guzmán and Casero (2012) report gender-based differences in career choices, albeit statistically insignificant. Rodríguez and Padín (2022) suggest that women may lean towards internal motivation criteria, such as vocation. Rodríguez et al. (2016) agree with our analysis that personal taste predominantly guides students' decisions, regardless of gender, although they note the influence of gender stereotypes in this decision-making process.

Rodríguez et al. (2006) emphasize the importance of introducing a modality choice system devoid of gender bias, a sentiment echoed in our research, which also finds no significant differences between learning styles and gender. Additionally, family influence on modality choice shows no gender disparity, aligning with studies by Cortés and Conchado (2012).

Other studies focus on differentiating university career choices or disparities observed in PISA tests based on gender. Unlike these studies, our research not only observes differences in choice but also analyzes the underlying motivations.

Regarding the results concerning the academic performance variable, which constitutes the second part of the third specific objective (SO3/H2), it was found that there were no significant differences. However, an intriguing trend emerged wherein social science students with high academic performance tended to value internal motivation factors more. Similar results were reported by Corrales (2020). Notably, science students with high grades tended to prioritize external motivation criteria, whereas humanities and social sciences students with high grades favored internal criteria.

Martínez et al. (2015) highlight a relationship between high average grades and the assessment of biomedical and social/legal sciences degrees, while Choi et al. (2017) emphasize the association between high academic performance and the pursuit of employability. Leontiev et al. (2020) also note the link between high average grades and vocational considerations in the choice of studies. These findings are consistent with studies linking higher average grades with degrees in science-related fields and better job prospects.

Quiñones-Negrete et al. (2020) emphasize how students with higher academic performance tend to develop a broader skill set, facilitating access to more sought-after university degrees, although they do not specify influential types of motivation.

The conclusions drawn from this study underscore the importance of delving into the internal and external motivations driving Baccalaureate students' choice of study modality. Variables such as gender and academic performance, among others examined in previous studies, play pivotal roles in these choices, necessitating a thorough understanding of their impact for more effective organizational development in the transition from secondary education to university.

Limitations of this study include the limited sample size and the convenience sampling method employed. Expanding the sample size in future studies could enhance result validity. Additionally, relying solely on quantitative analysis constitutes a limitation, and complementing it with qualitative research could offer deeper insights into the motivations studied. Moreover, this study is limited to the Spanish geographical area,

and a comparative analysis between motivations in Baccalaureate modality and university career choice could further enrich the discussion.

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Conflict of Interest

The authors of this paper declare that they have no conflict of interest in its publication.

References

- Baños, R., Ortiz, M., Baena, A., & Tristán, J. (2017). Satisfacción, motivación y rendimiento académico en estudiantes de Secundaria y Bachillerato: antecedentes, diseño, metodología y propuesta de análisis para un trabajo de investigación. *Espiral. Cuadernos del Profesorado*, 10(20), 40–50. <https://doi.org/10.25115/ecp.v10i20.1011>
- Trujillo, B. J. F., & Bermúdez, J. A. (2020). Las dimensiones de la motivación de logro y su influencia en rendimiento académico de estudiantes de preparatoria. *Enseñanza e Investigación en Psicología*, 2(1), 73-85.
- Bolarin, M. J., Porto, M., Martínez, N., & Méndez, R. (2015). Dimensiones de la motivación desde la perspectiva del alumnado: 20 años investigación. *Psicología em Estudo*, 20(4), 599-610. <https://doi.org/10.4025/psicoestud.v20i4.28227>
- Bosch, C., Mentz, E., & Reitsma, G. M. (2019). Integrating cooperative learning into the combined blended learning design model: Implications for students' intrinsic motivation. *International Journal of Mobile and Blended Learning*, 11(1), 58–73. <https://doi.org/10.4018/IJMBL.2019010105>
- Cepero, A. (2010). *Las preferencias profesionales y vocacionales del alumnado de secundaria y formación profesional específica*. Universidad de Granada.
- Choi, J., & Hwang, J. (2017). The effect of school choice on student's academic performance. *Hitotsubashi Journal of Economics*, 1-19. <https://doi.org/10.15057/28617>
- Clinkenbeard, P. R. (2012). Motivation and gifted students: Implications of theory and research. *Psychology in the Schools*, 49(7), 622-630. <https://doi.org/10.1002/pits.21628>
- Cortés, P., & Conchado, A. (2012). Los contextos parentales y académicos y los valores laborales en la toma de decisiones en Bachillerato. *Estudios Sobre Educación*, 22, 93–114.

- Corrales Serrano, M. (2020). *Estudio de las motivaciones internas y externas para la elección de modalidad del alumnado de Bachillerato. Incidencia en la didáctica de las Ciencias Sociales* [Tesis Doctoral]. Universidad de Extremadura. <https://dehesa.unex.es/handle/10662/11076>
- Corrales Serrano, M., Moreno Losada, J., & Sánchez-Martín, J. (2020). ¿Ciencias o letras? La motivación en la. Cómo trabajar las competencias éticas en la Universidad: Propuesta de experiencias. In L. Espejo Antínez, I. Sánchez-Casado & J. C. Adsuar Salas (Eds.), *Cómo trabajar las competencias éticas en la universidad. Propuesta de experiencias*. Wanceulen.
- Corrales Serrano, M., Sánchez-Martín, J., Moreno Losada, J., & Zamora Polo, F. (2021). The Role of the Social Sciences When Choosing University Studies: Motivations in Life Stories. *Education Sciences*, 11(8), 420. <https://doi.org/10.3390/educsci11080420>
- Corrales, M., Sánchez, J., Moreno, J., & Zamora, F. (2021). Educar en el interés social de las ciencias sociales: una intervención didáctica. *Revista Prisma Social*, 35, 249–276, pp. 129-139.
- D'Alessio, F., Avolio, B., & Charles, V. (2019). Studying the impact of critical thinking on the academic performance of executive MBA students. *Thinking Skills and Creativity*, 31, 275–283. <https://doi.org/10.1016/j.tsc.2019.02.002>
- Dávila-Acedo, M. A., Airado-Rodríguez, D., Cañada-Cañada, F., Sánchez-Martín, J. (2021). Detailed Emotional Profile of Secondary Education Students Toward Learning Physics and Chemistry. *Frontiers of Psychology*, 4, 12:659009. <https://doi.org/10.3389/fpsyg.2021.659009>.
- Diseth, A., Mathisen, F., & Samdal, O. (2020). A comparison of intrinsic and extrinsic motivation among lower and upper secondary school students. *Educational Psychology*, 40(8), 961–980. <https://doi.org/10.1080/01443410.2020.1778640>
- Domínguez-Alonso, J., Domínguez-Rodríguez, V., López-Pérez, E., & Rodríguez-González, M. (2016). Motivación e inteligencia emocional en estudiantes de Educación Secundaria Obligatoria. *Revista de Estudios e Investigación En Psicología y Educación*, 3(2), 94–101. <https://doi.org/10.17979/reipe.2016.3.2.1801>
- Eckes, A., Großmann, N., & Wilde, M. (2018). Studies on the effects of structure in the context of autonomy-supportive or controlling teacher behavior on students' intrinsic motivation. *Learning and Individual Differences*, 62, 69–78. <http://dx.doi.org/10.1016/j.lindif.2018.01.011>
- Escamilla-Fajardo, P., Alguacil-Jiménez, M., & González-Serrano, M. (2020). Variables predictoras de la motivación deportiva en estudiantes de secundaria federados y no federados. *Retos*, 38, 58–65. <https://doi.org/10.47197/retos.v38i38.73551>
- Garrocho, D. (2022). La Universidad como propósito. Una misión para nuestra institución. *Teoría De La Educación*, 34(2), 43–61. <https://doi.org/10.14201/teri.28333>
- Gaxiola, M., & Armenta, M. (2016). Factores que influyen en el desarrollo y rendimiento escolar de los jóvenes de bachillerato. *Revista Colombiana de Psicología*, 25(1), 63–82. <https://doi.org/10.15446/rcp.v25n1.46921>
- Gil-Lopez, J., Fuster-Guillen, F., Norabuena-Figueroa, R., Maldonado-Leyva, H., Norabuena-Figueroa, E., & Ronald-Hernández, R. (2019). Motivación académica y su influencia en el desarrollo de las capacidades de estudiantes en el área de inglés. *Revista de Psicología*, 15(30), 26–41.

- Gómez-Gómez, M. (2021). La formación del profesorado ante las nuevas oportunidades de enseñanza y aprendizaje virtual desde una dimensión tecnológica, pedagógica y humana. *Publicaciones*, 51(3), 565–584. <https://doi.org/10.30827/publicaciones.v51i3.18123>
- González-Benito, A., López-Martín, E., Expósito-Casas, E., & Moreno-González, E. (2021). Motivación académica y autoeficacia percibida y su relación con el rendimiento académico en los estudiantes universitarios de la enseñanza a distancia. *RELIEVE*, 27(2), 1-15. <http://doi.org/10.30827/relieve.v27i2.21909>
- Hortal, A. (2002). *Ética General de las profesiones*. Desclée De Brouwer.
- Kunanithaworn, N., Wongpakaran, T., Wongpakaran, N., Paiboonsithiwong, S., Songtrijuck, N., Kuntawong, P., & Wedding, D. (2018). Factors associated with motivation in medical education: a path analysis. *Medical Education*, 18(1), 1–9. <https://doi.org/10.1186/s12909-018-1256-5>
- Lai, H.-M., Hsiao, Y.-L., & Hsieh, P.-J. (2018). The role of motivation, ability, and opportunity in university teachers' continuance use intention for flipped teaching. *Computers & Education*, 124, 37–50. <https://doi.org/10.1016/j.compedu.2018.05.013>
- Leontiev, D., Osin, N., Fam, K., & Ovchinnikova, E. (2020). How you choose is as important as what you choose: Subjective quality of choice predicts well-being and academic performance. *Current Psychology*, 41(74) 1-13. <https://doi.org/10.1007/s12144-020-01124-1>
- Liu, I.-F. (2020). The impact of extrinsic motivation, intrinsic motivation, and social self-efficacy on English competition participation intentions of pre-college learners: Differences between high school and vocational students in Taiwan. *Learning and Motivation*, 72, 101675. <https://doi.org/10.1016/j.lmot.2020.101675>
- Llanes-Ordóñez, J., Méndez-Ulrich, J. L., & Montané-López, A. (2021). Academic motivation and satisfaction among students of education: an international perspective. *Educación XXI*, 24(1), 45–68, <http://doi.org/10.5944/educXX1.26491>
- Locke, E., & Schattke, K. (2019). Intrinsic and extrinsic motivation: Time for expansion and clarification. *Motivation Science*, 5(4), 277. <http://dx.doi.org/10.1037/mot0000116>
- López-Rupérez, F., Expósito-Casas, E., & García-García, I. (2021). Educación científica y brecha de género en España en alumnos de 15 años: análisis secundarios de PISA 2015. *Revista Complutense de educación. Revista Complutense de Educación*, 32(1), 1-14 <http://dx.doi.org/10.5209/rced.66090>
- Makarova, E., Aeschlimann, B., & Herzog, W. (2019). The gender gap in STEM fields: The impact of the gender stereotype of math and science on secondary students' career aspirations. *Frontiers in Education*, 4, 60. <https://doi.org/10.3389/educ.2019.00060>
- Marina, J. A. (2013). *Talento, motivación e inteligencia: Las claves para una educación eficaz*. Grupo Planeta.
- Martínez-Navarro, E. (2017). Ethics of development in a globalized world. *Veritas: Revista de Filosofía y Teología*, 37, 35–50. <https://doi.org/10.4067/S0718-92732017000200035>
- Martín-Rodrigo, M. (2018). *Influencia de los estereotipos de género en la elección de estudios universitarios*. Comillas.

- Martínez-Rodríguez, F., & Carmona-Orantes, G. (2010). Test de factores sociopersonales para la inserción laboral de los jóvenes: un instrumento para la evaluación y la formación. *Estudios sobre educación*, 18, 115–138.
- Martínez, A., Castro, M., Zurita, F., & Lucena, M. (2015). La elección de estudios superiores universitarios en función de la modalidad de estudios, la nota media y el género. *Magister*, 27(1), 18–25. <https://doi.org/10.1016/j.magis.2015.06.001>
- Morata I., Rodríguez, A., & Fernández, O. (2019). Autoconcepto académico, motivación escolar e implicación escolar del alumnado universitario de República Dominicana y España. *Aula Abierta*, 48(3), 271–278. <https://doi.org/10.17811/rifie.48.3.2019.271-278>
- Navarro-Guzmán, C., & Casero-Martínez, A. (2012). Análisis de las diferencias de género en la elección de estudios universitarios. *Estudios Sobre Educacion*, 22, 115–132 <https://doi.org/10.15581/004.22.2075>
- Ng, B. (2018). The neuroscience of growth mindset and intrinsic motivation. *Brain Sciences*, 8(2), 20. <https://doi.org/10.3390/brainsci8020020>
- Pintrich, P., Schunk, D., & Luque, M. (2006). *Motivación en contextos educativos: teoría, investigación y aplicaciones*. Pearson Prentice Hall.
- Quattrocchi, P., Flores, C., Cassullo, G., Moulia, L., De Marco, M., Shaferstein, C., Perea, Y., & Siniuk, D. (2017). Motivación y género en la elección de carrera. *Revista de Educación y Desarrollo*, 41, 27–35.
- Quiñones-Negrete, M. M., Martín-Cuadrado, A. M., & Coloma-Manrique, C. R. (2021). Rendimiento académico y factores educativos de estudiantes del programa de educación en entorno virtual. Influencia de variables docentes. *Formación universitaria*, 14(3), 25-36.
- Renger, D., Renger, S., Köller, M., & Möller, J. (2020). Teachers of tomorrow: How gender framings of the teaching profession affect students' intention to teach. *Zeitschrift Für Pädagogische Psychologie*, 1–11. <https://doi.org/10.1024/1010-0652/a000287>
- Rodríguez-Esteban, A., & Padín García, A. (2022). Diferencias según el género en los intereses académico-profesionales ¿persisten los estereotipos?. *Revista Española De Orientación Y Psicopedagogía*, 33(1), 148–166. <https://doi.org/10.5944/reop.vol.33.num.1.2022.33771>
- Rodríguez-Muñiz, L., Areces, D., Suárez-Álvarez, J., Cueli, M., & Muñiz, J. (2019). ¿Qué motivos tienen los estudiantes de Bachillerato para elegir una carrera universitaria. *Revista de Psicología y Educación*, 14(1), 1–15. <https://doi.org/10.23923/rpye2019.01.167>
- Rodríguez, M., Torío, S., & Fernández, C. M. (2006). El impacto del género en las elecciones académicas de los estudiantes asturianos que finalizan la ESO. *Revista Española de Orientación y Psicopedagogía*, 17(2), 239–260. <https://doi.org/10.5944/reop.vol.17.num.2.2006.11351>
- Rodríguez, M., Peña, J., & García, O. (2016). Estudio cualitativo de las diferencias de género en la elección de opciones académicas en los estudiantes del bachillerato científico-técnico. *Teoría de La Educación*, 28, 159–188. <http://dx.doi.org/10.14201/teoredu2016281189207>
- Rodríguez, M., Peña, J., & Inda, M. (2016). “Esto es lo que me gusta y lo que voy a estudiar”: Un estudio cualitativo sobre la toma de decisiones académicas en bachillerato. *Revista Complutense de Educación*, 27(3) 1351–1368. http://dx.doi.org/10.5209/rev_RCED.2016.v27.n3.48518

- Ruiz-, C., Méndez, I., & Herrero, Á. (2018). Evolución de las metas académicas en función del sexo y la edad y su influencia en el rendimiento académico en adolescentes murcianos. *Educatio Siglo XXI*, 36(3), 319–332. <https://doi.org/10.6018/j/350021>
- Ruiz, J., & Santana, L. (2018). Elección de carrera y género. *Revista Electrónica de Investigación y Docencia*, 19. <https://doi.org/10.17561/reid.v0i19.3470>
- Ryan, R., & Deci, E. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective: Definitions, theory, practices, and future directions. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Sáinz, M., & Meneses, J. (2018). Brecha y sesgos de género en la elección de estudios y profesiones en la educación secundaria. *Panorama Social*, 27, 23–31.
- Salgado, J. A., Lería, F. J., Franco, M. E. P., Gajardo, X. R., & Olivares, M. V. (2017). Efecto de la Motivación sobre la Profundidad en los Procesos de Estudio en Universitarios de Formación en Pedagogía. *Revista Iberoamericana Sobre Calidad, Eficacia Y Cambio En Educación*, 15(4), 87-105. <https://doi.org/10.15366/reice2017.15.4.005>
- Serin, H. (2018). The use of extrinsic and intrinsic motivations to enhance student achievement in educational settings. *International Journal of Social Sciences & Educational Studies*, 5(1), 191–194. <https://doi.org/10.23918/ijsses.v5i1p191>
- Sim, A. K., Tan, K. L., Sia, J. K. M., & Hii, I. S. (2020). Students' choice of international branch campus in Malaysia: a gender comparative study. *International Journal of Educational Management*, 35(1), 87-107.
- Treviño-Villarreal, D. C., & González-Medina, M. A. (2022). Involucramiento parental y logro educativo: un acercamiento a su relación en estudiantes de bachillerato. *RELIEVE*, 28(1). <http://doi.org/10.30827/relieve.v28i1.23786>
- Trigueros, R., & Navarro, N. (2019). La influencia del docente sobre la motivación, las estrategias de aprendizaje, pensamiento crítico y rendimiento académico de los estudiantes de secundaria en el área de Educación Física. *Psychology, Society, & Education*, 11(1), 137–150. <https://doi.org/10.25115/psye.v10i1.2230>
- Uex. (2013). *Reglamento de la comisión de bioética*. <http://investigalia.unex.es/#!/page36.do?acond12=es&rcond3.att2=197&kcond92.att3=231>
- Vaquero, L., Martín, C., Ruiz, G., & Bautista, P. (2018). Rendimiento, motivación y satisfacción académica, ¿una relación de tres? *Revista Electrónica de Investigación y Docencia Creativa*, 7, 92–97. <http://dx.doi.org/10.30827/Digibug.49829>
- Vázquez, S., Biggio, M., & García, S. (2013). Relaciones entre rendimiento académico, competencia espacial, estilos de aprendizaje y deserción. *Revista Electronica de Investigacion Educativa*, 5(1), 29–44.