

# Entrepreneurial self-efficacy among first-year undergraduates: Gender, creative self-efficacy, leadership self-efficacy, and field of study

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## ABSTRACT

**Objective:** To contribute to a better understanding of the factors that influence university students' confidence in their ability to engage in entrepreneurial behaviours.

**Research Design & Methods:** Participants were 1741 first-year students (792 women, 949 men) from two Spanish universities (Mage = 18.76, SD = 1.82). They were enrolled in degree programmes in two broad fields: engineering and architecture, and social sciences and law. Using a quantitative cross-sectional design, we obtained measures of creative self-efficacy, leadership self-efficacy, and entrepreneurial self-efficacy.

**Findings:** Results showed that both leadership self-efficacy and creative self-efficacy predicted entrepreneurial self-efficacy, although creative self-efficacy was the variable that contributed most to the expected change in entrepreneurial self-efficacy. There were also differences in entrepreneurial self-efficacy according to gender and field of study, with students enrolled in a technical field and men in general scoring higher. Mediation-moderation analysis showed that creative self-efficacy mediated the relationship between gender and entrepreneurial self-efficacy, and also that the field of study buffered the effect of gender on entrepreneurial self-efficacy.

**Implications & Recommendations:** The results of this study showed that entrepreneurial self-efficacy is predicted by creative self-efficacy and leadership self-efficacy, and hence both these variables should be addressed by training initiatives aimed at promoting entrepreneurship among undergraduates, particularly among young women. Moreover, our results highlighted the importance of taking into consideration individuals' educational backgrounds when analysing students' entrepreneurial self-efficacy.

**Contribution & Value Added:** This research contributes to the literature on entrepreneurship by identifying factors that influence the entrepreneurial self-efficacy of university students. The findings highlight the importance of considering creative self-efficacy when analysing students' entrepreneurial development. Furthermore, we show that creative self-efficacy has a mediating effect on the association between gender and entrepreneurial self-efficacy, and also that this relationship is moderated by students' fields of study. Overall, these results suggest that reinforcing the creative self-efficacy of women could help to close the gender gap in entrepreneurial self-efficacy. It might also be useful to design specific training initiatives for undergraduates enrolled in social sciences, the aim of which would be to foster an entrepreneurial culture and encourage them to recognize their potential role as entrepreneurs.

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## INTRODUCTION

Entrepreneurial competence is regarded as one of the key factors underpinning self-realization, employability, citizen participation, and social inclusion (European Union, 2019). It is defined as the ability

to transform opportunities and ideas into products and services of value, and it has been linked to innovation and socioeconomic growth (Nowiński *et al.*, 2019). As a result, there is growing interest among researchers in understanding what leads individuals to pursue an entrepreneurial career (Nabi *et al.*, 2015; Newman *et al.*, 2019). Identifying variables that may influence the development of entrepreneurial competence is especially important in the case of young adults who are embarking upon higher education (Newman *et al.*, 2019; Obschonka *et al.*, 2017). A better understanding of the factors influencing university students' entrepreneurial competence would help to institutionalise entrepreneurial culture and to inform emerging research on entrepreneurship (Al-Mamary & Alshallaqi, 2022).

One issue of particular interest concerns students' beliefs about their entrepreneurial capabilities, that is to say, their entrepreneurial self-efficacy (Newman *et al.*, 2019; Nowiński *et al.*, 2019). The notion of entrepreneurial self-efficacy is informed by social cognitive theory and it refers to the degree of confidence that individuals have in their ability to perform tasks and roles associated with entrepreneurship (Chen *et al.*, 1998). Research suggests that people who are more confident in this respect are more likely to pursue an entrepreneurial career (Newman *et al.*, 2019). A close relationship was similarly found between high levels of entrepreneurial self-efficacy and behaviours associated with entrepreneurship (Dempsey & Jennings, 2014; Hmieleski & Corbett, 2007).

Regarding the variables that may influence the development of entrepreneurial self-efficacy among university students, it is important to recognise that this capability is underpinned by different kinds of self-efficacy (Fuller *et al.*, 2018). For instance, research found that creative self-efficacy is an important precursor of creative effort and performance (Mathisen & Bronnick, 2009), and in the entrepreneurial context, it was shown that a person's creative confidence beliefs play a key role in decisions about whether or not to embark on an entrepreneurial career (Fuller *et al.*, 2018). Furthermore, a number of recent studies (Fuller *et al.*, 2018; Naz *et al.*, 2020) examined the relationship between leadership and stronger entrepreneurial self-efficacy. In the education context, albeit the variables capable of influencing entrepreneurial activity (Škare *et al.*, 2022), were generally studied separately. The present study seeks to address this gap by analysing the influence of both creative self-efficacy and leadership efficacy on students' confidence in their ability to engage in entrepreneurship.

In addition to examining how students' confidence in their ability to become entrepreneurs may be shaped by different types of self-efficacy, it is also necessary to consider the role of their field of study (Teixeira & Forte, 2015). One of the most influential models for studying educational and occupational choices is the social cognitive career theory (Lent & Brown, 2019). According to it, people's professional and academic decisions are determined by various contextual factors, one of which is self-efficacy (Bandura, 1997; Lent & Brown, 2019). However, studies of entrepreneurial intentions conducted in the higher education setting tend either to include business students only or fail to consider (and therefore control for) the possible influence of the field of study (Teixeira & Forte, 2017; Tsang, 2019).

Furthermore, in view of the considerable evidence of a gender difference in the intention to become an entrepreneur, with women being less likely than men to report such intentions (Dempsey & Jennings, 2014), another aim of the study was to analyse gender differences in students' entrepreneurial self-efficacy. A recent report by the Global Entrepreneurship Monitor (GEM, 2019) highlighted the gender gap that exists in the early stages of business development, which in the European Union is reflected in the fact that women are less likely than their male peers to embark upon an entrepreneurial career (OECD/European Union, 2019). This inequality was linked to sex-role stereotypes within the entrepreneurial world (Ahl, 2006; Alsos *et al.*, 2013), a phenomenon that has been observed among European MBA students (Mueller & Conway Dato-on, 2013) and which has the potential to affect women's entrepreneurial self-efficacy and intentions. In recent decades, various studies have examined gender differences in entrepreneurial self-efficacy. Some of these studies, carried out in a higher education context, found that women have on average lower levels of entrepreneurial self-efficacy than men (Dempsey & Jennings, 2014; Wilson *et al.*, 2009), a finding replicated in a Spanish context (Díaz-García & Jiménez-Moreno, 2010). However, other studies have observed no gender differences in entrepreneurial self-efficacy among university students (Mueller & Dato-On, 2008; Zhao *et al.*, 2005). It has been suggested that these inconclusive results are due to insufficient consideration of context (Ng & Fu, 2018), as well as to the multifaceted nature of entrepreneurial self-efficacy (Fuller *et al.*, 2018; Nowiński *et al.*, 2019).

With the aforementioned issues in mind, the primary goal of this study was to explore different factors that might influence university students' confidence in their ability to engage in entrepreneurial behaviours. Understanding more about these relationships would help in designing specific training initiatives aimed at improving students' entrepreneurial competence.

### LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Entrepreneurial competence is one of the basic meta-skills that young people need to develop to succeed in modern society (Halberstadt *et al.*, 2019). It is important to note that this competence goes beyond the ability to create innovative organizations. As the European Union indicates (2019), entrepreneurship also implies the development of other skills such as creativity and the sense of initiative, skills that play a key role in a person's professional development (Lans *et al.*, 2014) and which are crucial to fostering an entrepreneurial culture (Edwards-Schachter *et al.*, 2015). The importance of these skills is further underlined by the impact that technology has on our ways of working (OECD, 2019a), a tendency that has intensified during the COVID-19 pandemic (Giones *et al.*, 2020). As several authors point out (Newman *et al.*, 2019; Obschonka *et al.*, 2017), entrepreneurial competence could help future generations to manage these social changes. Similarly, the OECD (2019b) considers that fostering entrepreneurial behaviours among students can help them not only to be better prepared when confronted with uncertainty but also to develop a greater sense of self-worth. Accordingly, and given the implications that entrepreneurial competence has for a person's future performance at work and as a member of society, there is growing interest in how it might be developed within the educational setting, especially within higher education (Nowiński *et al.*, 2019).

An important aspect to consider here concerns people's self-perception beliefs, which according to social cognitive theory play a key role in motivation and goal attainment (Bandura, 1997). These self-efficacy beliefs have been defined as the degree to which a person has confidence in their ability to perform a task successfully in a given context (Bandura, 1997). When faced with an academic or professional challenge, the person's level of self-efficacy will influence their decision to confront the challenge, as well as their level of motivation, preparation, and perseverance in doing so (Bandura *et al.*, 1997). This is why the aforementioned social cognitive career theory (Lent & Brown, 2019) highlights the central role that self-beliefs play in occupational development.

#### Entrepreneurial Self-efficacy

Entrepreneurial self-efficacy refers specifically to person's confidence about their ability to perform the various tasks and roles relevant to entrepreneurship (Newman *et al.*, 2019; Zhao *et al.*, 2005). Research found that people with higher entrepreneurial self-efficacy show stronger entrepreneurial intentions and are more confident in their ability to develop viable business ventures (Gubik, 2021; Newman *et al.*, 2019; Zhao *et al.*, 2005). This pattern of relationships was also observed among university students (Díaz-García & Jiménez-Moreno, 2010; Lanero *et al.*, 2016), in the case of whom studies have specifically found that self-efficacy promotes an entrepreneurial mindset (Wardana *et al.*, 2020) and mediates the impact of entrepreneurial education on intentions (Nowiński *et al.*, 2019). A close relationship between high entrepreneurial self-efficacy and social entrepreneurial intent was also reported in college students (Barton *et al.*, 2018).

#### Creative Self-efficacy

Creativity has been considered the key factor in the development of entrepreneurial competence, because of its role in the identification of possible business opportunities (Ko & Butler, 2007) and in driving organizational innovation (Ip *et al.*, 2018). In this context, the notion of creative self-efficacy, defined as a person's beliefs about their ability to produce creative outcomes (Tierney & Farmer, 2002) became the topic of increasing interest among researchers (Karwowski & Lebeda, 2018), not least following the Covid-19 pandemic (González-Tejero *et al.*, 2022). This relatively recent line of research has revealed associations between creative self-efficacy and creative development at both the individual (Robbins & Kegley, 2010) and team level (Shin & Eom, 2014). Importantly, this rela-

tionship was observed in different contexts, including education (Mathisen & Bronnick, 2009; Robbins & Kegley, 2010), where there is empirical evidence of differences in perceived creativity across students from different degree programmes (Álvarez-Huerta *et al.*, 2019). In the field of entrepreneurship, studies found that individuals high in creative self-efficacy are more likely to explore cognitively the idea of becoming an entrepreneur (Fuller *et al.*, 2018).

### **Leadership Self-efficacy**

In addition to creativity, research also highlighted the importance of leadership as a precursor to entrepreneurial activity (Fuller *et al.*, 2018; Obschonka *et al.*, 2017; Redmond *et al.*, 2017). Although a considerable body of research produced numerous definitions of leadership (Gandolfi *et al.*, 2017), it is generally viewed as a social process through which one person exerts influence over others in order to guide, structure, and facilitate goal achievement and interactions (Yukl, 2006). According to Huszczo and Endres (2017), leaders need a high level of self-awareness. As for leadership self-efficacy, this has been identified as one of the key variables regulating leader functioning in a dynamic entrepreneurial environment (McCormick, 2001). Leadership self-efficacy refers to a person's confidence in their ability to lead others (Dwyer, 2019), and in general, higher leadership self-efficacy has been linked to better leader performance and to more interest and effort towards becoming a better leader (Huszczo & Endres, 2017).

Therefore, given that different kinds of self-efficacy beliefs appear to underlie entrepreneurial self-efficacy (Fuller *et al.*, 2018), one of the hypotheses we examined in the study was that both creative self-efficacy and leadership self-efficacy will predict entrepreneurial self-efficacy among first-year undergraduates.

### **Self-efficacy, Entrepreneurship, and Gender**

Currently, there is a clear gender gap when it comes to entrepreneurial activity (Wieland *et al.*, 2019) and within the European Union women are less likely than men to embark upon an entrepreneurial career (OECD/European Union 2019). Research in this field found that lower entrepreneurial self-efficacy is associated with less propensity towards entrepreneurship and vice versa (Newman *et al.*, 2019), hence it was hypothesised that women engage in fewer entrepreneurial activities, because they have less entrepreneurial self-efficacy than men (Kickul *et al.*, 2008). Furthermore and in addition to the role played by low entrepreneurial self-efficacy, various studies have shown that men tend to report higher creative self-efficacy than women (Karwowski, 2011; Zhou *et al.*, 2012). However, not all authors have found differences in this respect (Zhang & Zhou, 2014). Similarly, some authors reported that women are less confident than men about their leadership capabilities (McCormick *et al.*, 2002; Sheppard, 2018), whereas others found no gender differences in this area (Huszczo & Endres, 2017). As noted earlier, it was suggested that these inconclusive results are due to insufficient consideration of context (Ng & Fu, 2018). Accordingly, the primary goal of the study was to address the need for research in this field beyond the English-speaking world. In Spain, the stereotype of the male entrepreneur appears to persist (Liñán *et al.*, 2022), therefore, we hypothesised that male students in the Spanish universities where this study was carried out will score higher than women on entrepreneurial self-efficacy, creative self-efficacy, and leadership self-efficacy.

Given that various studies (Díaz-García & Jiménez-Moreno, 2010; Lanero *et al.*, 2016) found a positive correlation between students' entrepreneurial self-efficacy and their entrepreneurial intentions, and in light of the well-documented gender gap in entrepreneurial activity (GEM, 2019), it is important to understand more about gender differences in entrepreneurial self-efficacy, especially as the findings to date are inconclusive. As noted earlier, entrepreneurial self-efficacy is underpinned by other types of self-efficacy, such as creativity and leadership (Fuller *et al.*, 2018; Tantawy *et al.*, 2021). Moreover, there is recent evidence that women's perceived confidence to discover, create and use entrepreneurial opportunities can influence their decision to start an entrepreneurial career (Huang *et al.*, 2022). It is therefore of interest to examine the extent to which students' confidence in their ability to generate new ideas and to take the lead in implementing them is influenced by sex-role stereotypes that persist within the entrepreneurial context (Mueller & Conway Dato-on, 2013). Accordingly, we hypothesise

that the relationship between gender and entrepreneurial self-efficacy will be partially explained by the mediation effect of creative self-efficacy and leadership self-efficacy.

A related issue to consider here is that entrepreneurship has traditionally been associated with the so-called hard sciences (natural science or physics), as opposed to the soft sciences (social sciences) (Pilegaard *et al.*, 2010; Rafiei *et al.*, 2019). Given that perceived self-efficacy plays a decisive role in career choice (Lent & Brown, 2019), this association may also be reflected in different levels of self-efficacy among students from different fields of study. In this regard, some authors have noted that students' entrepreneurial potential is rarely addressed outside of business or management programmes (Vazquez-Burguete *et al.*, 2012). However, very few studies have examined the relationship between the field of study and students' confidence in their creative, entrepreneurial and leadership abilities (Teixeira & Forte, 2017). Some hypothesise here that students enrolled in a technical field (engineering and architecture) will score higher than their peers from the social sciences on entrepreneurial self-efficacy, creative self-efficacy and leadership self-efficacy.

Importantly, this issue of field of study interacts with gender, insofar as women are less likely to pursue STEM subjects (*i.e.* science, technology, engineering, and mathematics) in higher education (Wegemer & Eccles, 2019). It has been argued that this is partly a consequence of the negative impact that gender stereotypes have on women's self-perceptions of their ability to follow certain career paths (Tellhed *et al.*, 2017). Interestingly, studies conducted in what have traditionally been regarded as male subject areas, such as engineering, have found that women students in these fields score higher on self-efficacy than women from other degree programmes (Sax & Newhouse, 2019). Accordingly, one would also expect to find greater entrepreneurial self-efficacy among women who enrol in science, mathematics, or engineering degrees, in comparison with their peers studying within the social sciences. If this proved to be the case, it would suggest that the field of study has a moderator effect on the relationship between gender and entrepreneurial self-efficacy, and this is the fifth hypothesis examined in the present study.

### **This Study**

Fostering the kinds of self-efficacy required for entrepreneurial competence is clearly an important task for higher education systems (Vázquez-Burguete *et al.*, 2012) and given that this competence has been associated with more skilled and more successful professionals, as well as with higher life satisfaction, it is important that we understand more about the variables that underpin its development (Al-Mamary & Alshallaqi, 2022). However, despite its importance for young people and their future, there have been few initiatives within universities aimed at promoting entrepreneurial competence among students, especially from a gendered perspective and in those subject areas that have not traditionally been linked to entrepreneurship, that is, social sciences, law, and humanities. In our view, this is in part due to an insufficient understanding within higher education of the variables that may lead to greater entrepreneurial competence. With regard to our own cultural context, strategies to promote entrepreneurship are not yet implemented across the board at Spanish universities, although there are increasing calls to promote entrepreneurship as a competence among the country's higher education students (Vicens *et al.*, 2022).

The present study aims to make three main contributions to the literature on entrepreneurship. The first is to elucidate in more detail how entrepreneurial self-efficacy is influenced by both creative self-efficacy and leadership self-efficacy. As Newman *et al.* (2019) point out, it is crucial to identify the factors that underpin entrepreneurial self-efficacy, a variable that has been shown in recent studies to play the key role in students' entrepreneurial development (Gubik, 2021; Doanh, 2021). Our second goal here is to analyse gender differences in entrepreneurial self-efficacy and to examine whether this relationship is mediated by creative self-efficacy and leadership self-efficacy. The acknowledged gender gap in the field of entrepreneurship underlines the importance of understanding more about why women engage less than men with entrepreneurial ventures (Reissova *et al.*, 2020). Finally, we will examine whether the relationship between gender and entrepreneurial self-efficacy is influenced by the field of study. Analysing how the development of entrepreneurial self-efficacy is shaped by these different factors is an essential first step towards designing strategies aimed at encouraging students

to follow an entrepreneurial career or to exhibit entrepreneurial behaviour in different work contexts. The specific study hypotheses were as follows:

- H1:** Creative self-efficacy and leadership self-efficacy will both predict entrepreneurial self-efficacy among first-year undergraduates.
- H2:** Male students will score higher than their female peers on entrepreneurial self-efficacy, creative self-efficacy, and leadership self-efficacy.
- H3:** The relationship between gender and entrepreneurial self-efficacy will be partially explained by the mediation effect of creative self-efficacy and leadership self-efficacy.
- H4:** Students enrolled in a technical field (engineering and architecture) will score higher than their peers from the social sciences on entrepreneurial self-efficacy, creative self-efficacy, and leadership self-efficacy.
- H5:** The field of study will have a moderator effect on the relationship between gender and entrepreneurial self-efficacy.

## RESEARCH METHODOLOGY

Participants were 1741 first-year students (792 female, 949 male students) from two universities in northern Spain. They were aged between 17 and 27 (mean = 18.76, SD = 1.82) and were enrolled in degree programmes in either a technical field (engineering and architecture,  $n = 683$ ) or the social sciences (social sciences and law,  $n = 1058$ ).

### Measures

*Entrepreneurial self-efficacy.* It was assessed using four items developed by Zhao *et al.* (2005) to measure self-efficacy in relation to specific entrepreneurial tasks. Respondents are asked to indicate on a five-point Likert scale how confident they are (1 = no confidence; 5 = complete confidence) in their ability to identify business opportunities, create new products, think creatively, and commercialize an idea or new development (*e.g.* 'How confident are you in your present readiness for successfully identifying new business opportunities?'). In the present sample, McDonald's  $\omega$  coefficient of reliability was 0.68.

*Creative self-efficacy.* It was measured using the three-item instrument developed by Tierney and Farmer (2002) to assess employees' perceived capacity for creative work. Each item (*e.g.* 'I have confidence in my ability to solve problems creatively') is rated on a seven-point Likert scale ranging from 1 (Totally disagree) to 7 (Totally agree). The instrument has been widely used in educational settings and it has shown good psychometric properties (Robbins & Kegley, 2010). Internal consistency in the present sample was 0.65 (McDonald's  $\omega$ ).

*Leadership self-efficacy.* It was assessed using three items developed originally by Singer (1991) and employed subsequently in studies by Paglis and Green (2002) and Bobbio and Manganelli (2009), showing positive correlations with other measures of leadership self-efficacy. Each item (*e.g.* 'If you were in a leadership position, how effective do you think you would be as a leader?') is rated on a seven-point Likert scale. Internal consistency in the present sample was 0.88 (McDonald's  $\omega$ ).

### Procedure

In order to maximize statistical power for detecting effects of reasonable magnitude, we first determined the optimum sample size using G\*Power (Faul *et al.*, 2007). The calculation indicated that for linear bivariate regression: two groups, with a difference between slopes of 0.015 and power of 95%, a minimum sample of 1446 participants (723 men and 723 women) would be needed. We then used convenience sampling to recruit students from the aforementioned two universities during the 2018-2019 and 2019-2020 academic years. This approach means that the study design was cross-sectional.

Data were then collected using the three instruments described in the previous section, each of which was hosted online in the form of a single survey. The research team explained to students the nature of the study and how to access the survey. It was made clear to them that participation

was voluntary and that all data would remain confidential in accordance with current Spanish legislation to this effect. The study protocol was reviewed and approved by the research ethics committees of both universities.

### Data Analysis

The statistical analysis involved four steps. Firstly, we performed descriptive and bivariate correlation (Pearson) analyses for all variables of interest. We then conducted a linear regression analysis to examine the effect of creative self-efficacy and leadership self-efficacy on entrepreneurial self-efficacy (H1). Next, we performed a multivariate analysis of variance to determine whether gender and the field of study had an influence on creative self-efficacy, leadership self-efficacy, and entrepreneurial self-efficacy (H2 and H3). Finally, we developed a moderated mediation model to test the possible mediator effect of creative self-efficacy and leadership self-efficacy on the relationship between gender and entrepreneurial self-efficacy (H4) and to examine whether this relationship was moderated by field of study (H5). The model was tested using maximum likelihood estimation and 10000 bootstrapping samples at 95% confidence intervals. All data analyses were performed using Mplus 7.4 (Muthén *et al.*, 2016). The conceptual framework of the moderated mediation model is shown in Figure 1.

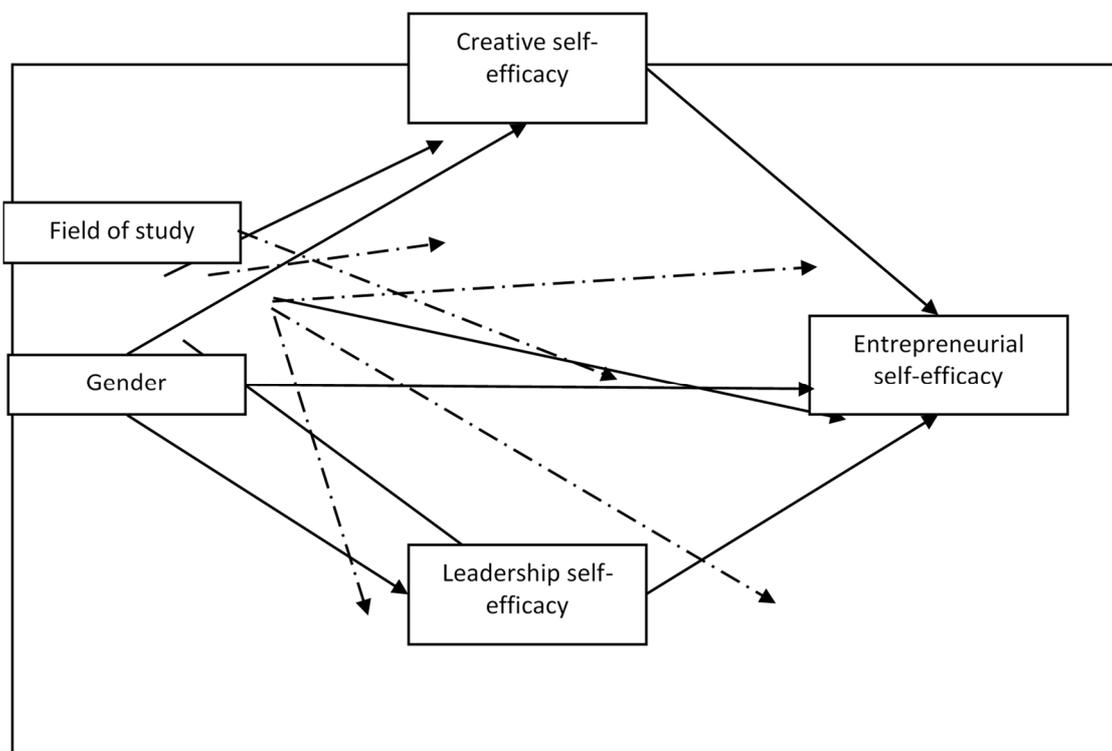


Figure 1. Conceptual framework of the moderated mediation model

Source: own elaboration.

## RESULTS AND DISCUSSION

The results of the descriptive analysis are shown in Table 1.

In the bivariate correlation analysis, entrepreneurial self-efficacy showed positive and significant correlations of moderate magnitude with both creative self-efficacy ( $r = 0.50; p < 0.01$ ) and leadership self-efficacy ( $r = 0.33; p < 0.01$ ). The analysis also revealed a positive and significant correlation of moderate magnitude between creative self-efficacy and leadership self-efficacy ( $r = 0.35; p < 0.01$ ).

**Table 1. Descriptive statistics for the total sample and by gender**

| Variables                                    | Total – N = 1741 | Female – N = 792 | Male – N = 949 |
|--|------------------|------------------|----------------|
| Age, <i>M (SD)</i>                           | 18.76 (1.82)     | 18.44 (1.60)     | 19.03 (1.94)   |
| Entrepreneurial self-efficacy, <i>M (SD)</i> | 14.46 (2.38)     | 14.21 (2.46)     | 14.67 (2.29)   |
| Creative self-efficacy, <i>M (SD)</i>        | 15.45 (2.04)     | 15.21 (1.98)     | 15.65 (2.06)   |
| Leadership self-efficacy, <i>M (SD)</i>      | 15.07 (2.97)     | 15.02 (2.96)     | 15.10 (2.99)   |
| Field of study, % (N)                        |                  |                  |                |
| Social sciences and law                      | 60.77 (1058)     | 74.37 (598)      | 25.63 (203)    |
| Engineering and architecture                 | 39.23 (683)      | 49.42 (469)      | 50.58 (480)    |

Source: own study.

In order to test whether creative self-efficacy and leadership self-efficacy predicted entrepreneurial self-efficacy, we performed a multiple linear regression analysis; firstly, in the total sample and then for male and female students separately. In the total sample, the linear model obtained after testing the assumptions of linearity, non-collinearity, independence, normality, and homoscedasticity explained 28% of the variance in entrepreneurial self-efficacy. The results showed that both creative self-efficacy ( $\beta = 0.443$ ,  $z = 22.278$ ,  $p < 0.0001$ ) and leadership self-efficacy ( $\beta = 0.170$ ,  $z = 7.881$ ,  $p < 0.0001$ ) predicted entrepreneurial self-efficacy, thus confirming, as expected, that the higher the creative self-efficacy and leadership self-efficacy, the higher the entrepreneurial self-efficacy. The standardized regression coefficients indicated that creative self-efficacy was the variable that contributed most to the expected change in entrepreneurial self-efficacy. Accordingly, creative self-efficacy accounted for more of the overall fit (17.14%) than leadership self-efficacy, which had a minimal impact in terms of reducing prediction errors (0.25%).

The same pattern of results was observed when performing the analysis by gender. Among male students, both creative self-efficacy ( $\beta = 0.417$ ,  $t = 15.186$ ,  $p < 0.0001$ ) and leadership self-efficacy ( $\beta = 0.213$ ,  $t = 7.798$ ,  $p < 0.0001$ ) predicted entrepreneurial self-efficacy. Female students' scores on entrepreneurial self-efficacy were likewise predicted by both creative self-efficacy ( $\beta = 0.457$ ,  $t = 15.728$ ,  $p < 0.0001$ ) and leadership self-efficacy ( $\beta = 0.130$ ,  $t = 4.049$ ,  $p < 0.0001$ ).

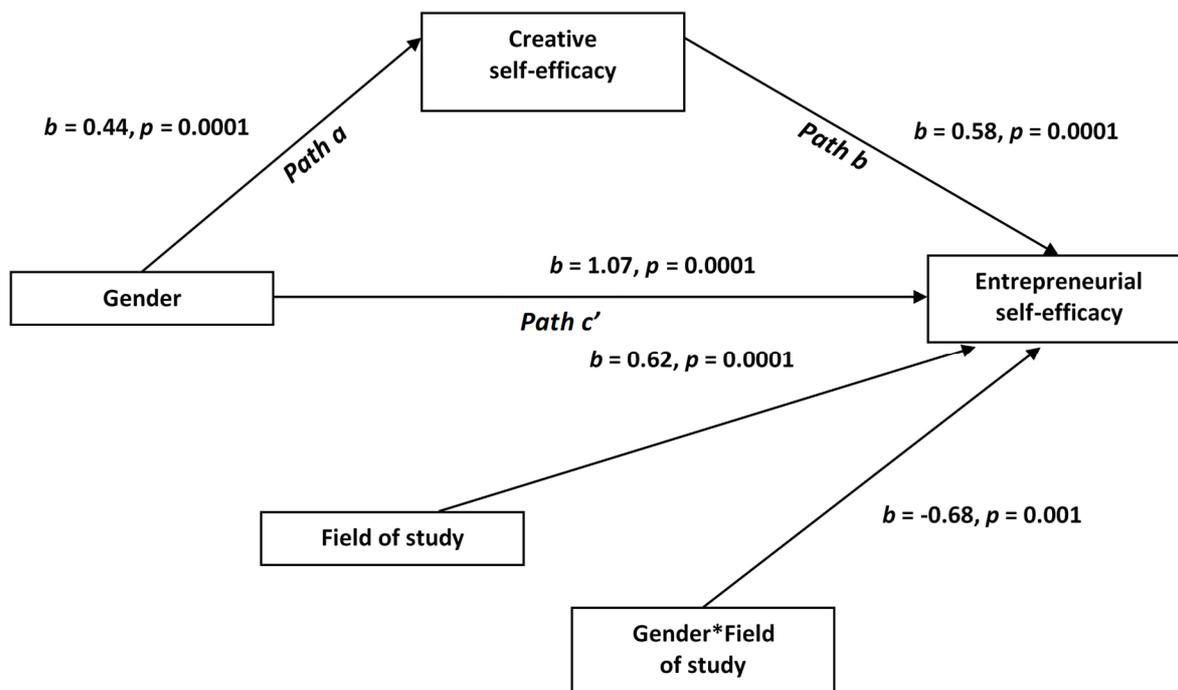
We then performed a multivariate analysis of variance to determine whether gender and the field of study had an influence on creative self-efficacy, leadership self-efficacy, and entrepreneurial self-efficacy. The results of the MANOVA showed that gender had a statistically significant effect on the scores obtained on both entrepreneurial self-efficacy,  $F(1,1735) = 4.362$ ;  $p = 0.037$ , and creative self-efficacy,  $F(1,1735) = 11.434$ ;  $p = 0.001$ . No significant effect was observed for leadership self-efficacy. The effect size associated with gender differences in all three cases was low (Hedges'  $g_{\text{Male-Female}} = 0.19$ , 0.22 and 0.03, respectively). These results indicate that although male students showed more entrepreneurial self-efficacy and creative self-efficacy than their female peers, the differences were small in magnitude.

Regarding the field of study, scores on entrepreneurial self-efficacy differed significantly according to whether students were enrolled in engineering and architecture or social sciences and law,  $F(1,1735) = 10.123$ ;  $p = 0.001$ . However, the field of study did not have an effect on creative self-efficacy or leadership self-efficacy. The effect size associated with the difference in means was small in all cases (Hedges'  $g_{\text{Engineering and Architecture-Social Sciences and Law}} = 0.16$ , 0.13 and 0.07, respectively).

In order to examine the fit of the measurement model derived from the set of instruments used, we performed a confirmatory factor analysis (CFA), using the robust maximum likelihood method for parameter estimation. The proposed model yielded acceptable fit indices:  $\chi^2[32] = 402.411$ ;  $p < 0.001$ ; CFI = 0.933; TLI = 0.905; RMSEA [90% CI] = 0.082 [0.075; 0.089]; SRMR = 0.053. Measurement invariance by gender was also confirmed.

Regarding mediation effects, it can be seen in Figure 2 that gender had a statistically significant indirect effect on entrepreneurial self-efficacy via creative self-efficacy,  $\beta = 0.25$ , 95% CI [0.111; 0.408]. These results indicate that the difference between male and female students in entrepreneurial self-efficacy is partially explained by the higher creative self-efficacy of males. It should be noted that neither the main effect of gender on leadership self-efficacy nor the main effects of the

field of study on creative self-efficacy and leadership self-efficacy were statistically significant. Neither was there an interaction effect of gender and field of study on creative self-efficacy or leadership self-efficacy. Non-significant results were similarly obtained when analysing possible interaction effects of creative self-efficacy and field of study on entrepreneurial self-efficacy, and of leadership self-efficacy and field of study on entrepreneurial self-efficacy. These effects were therefore eliminated from the final model as they did not improve the overall fit ( $\Delta\chi^2 = 7951.371$ ,  $\Delta df = 3$ ). The resulting model showed a good fit:  $\chi^2[2] = 4.405$ ;  $p > 0.05$ .; CFI = 0.966; TLI = 0.984; RMSEA [90% CI] = 0.026 [0.000; 0.060]; SRMR = 0.009.



**Figure 2. Statistical form of the conditional process model (moderated mediation)**

**Note:** total effect,  $b = 1.33$ , 95% CI [0.194; 0.693]; indirect effect,  $b = 0.25$ , 95% CI [0.111; 0.408].

The direction of the arrows represents the direction of the assumed causal flow.

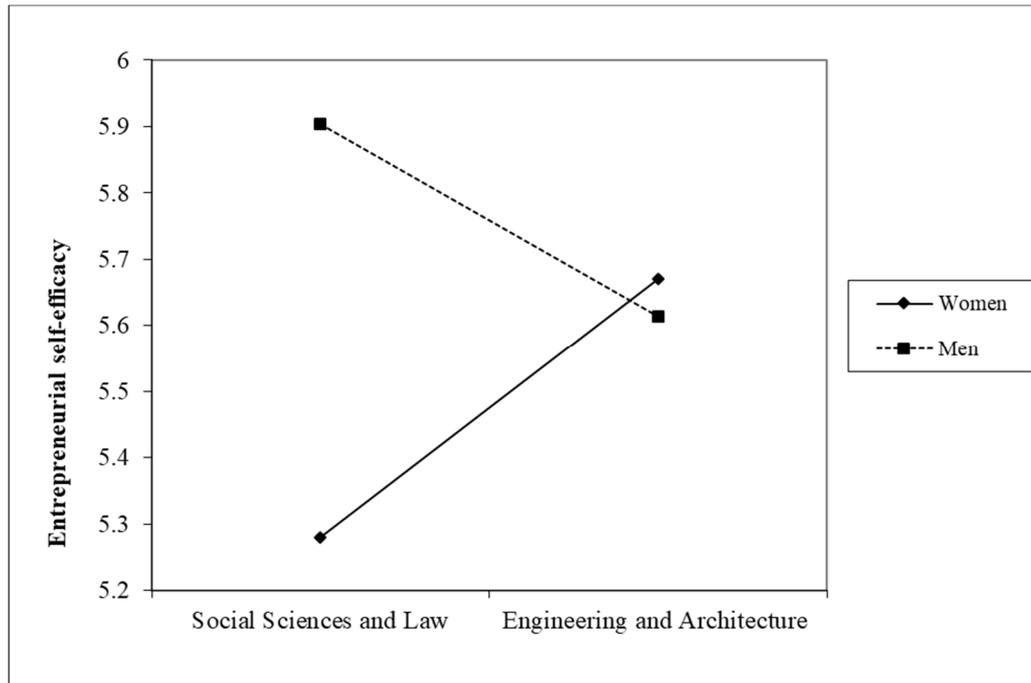
The total effect of gender is the difference observed between the means for entrepreneurial self-efficacy in the two groups (men/women).

The indirect effect of gender on entrepreneurial self-efficacy is part of the difference in entrepreneurial self-efficacy between men and women resulting from the mediation process that is captured by the product of the non-standardized regression coefficients of Path a and Path b.

The direct effect, Path c', estimates the difference in entrepreneurial self-efficacy between males and females on average, independent of the mediation process captured by the indirect effect.

Source: own elaboration.

Finally, the analysis showed a negative and statistically significant interaction effect of gender and field of study on entrepreneurial self-efficacy ( $b = -0.68$ ,  $z = -3.404$ ,  $p < 0.001$ ). As visible in Figure 3, female students enrolled in engineering and architecture degrees scored higher on entrepreneurial self-efficacy than did their female peers in social sciences and law, whereas the opposite effect was observed among male students. This indicates that the field of study buffers the effect of gender on entrepreneurial self-efficacy.



**Figure 3. Interaction effect of gender and field of study on entrepreneurial self-efficacy**

Source: own elaboration.

## CONCLUSIONS

The study aimed to contribute to a better understanding of the factors that influence the entrepreneurial self-efficacy of university students. Firstly, we examined whether creative self-efficacy and leadership self-efficacy predicted entrepreneurial self-efficacy. As expected, the analysis revealed a positive correlation between these three variables and more specifically that creative self-efficacy and leadership self-efficacy predicted entrepreneurial self-efficacy. This result is consistent with the literature on the role played by creativity and leadership in shaping a person's entrepreneurial profile (Gonzalez-Tejero *et al.*, 2022; Skare *et al.*, 2022). It also supports research showing how students' confidence in their entrepreneurial capabilities is underpinned by other types of self-efficacy (Fuller *et al.*, 2018; Tantawy *et al.*, 2021), specifically in this case, creative self-efficacy and leadership self-efficacy. Overall, our results suggest the need to address both creative self-efficacy and leadership self-efficacy within training initiatives aimed at promoting the entrepreneurial competence of undergraduates. Importantly, however, our analysis also showed that of the two variables it was creative self-efficacy that contributed most to the expected change in entrepreneurial self-efficacy. This finding, in what to our knowledge is the first study of its kind to be conducted outside the North American context, is in line with previous reports that have emphasized the importance of creative self-efficacy as a driver of innovative behaviour and entrepreneurial confidence, as well as its influence on entrepreneurial decisions and intentions (Fuller *et al.*, 2018; Tantawy *et al.*, 2021), suggesting that creative self-efficacy should be considered the key competence of entrepreneurs.

As to why leadership self-efficacy was a less important predictor of entrepreneurial self-efficacy than creative self-efficacy, the relative contributions of these two variables to perceived entrepreneurial competence have not, to our knowledge, been explored previously in undergraduates. An interesting topic for future research would therefore be to explore how students understand leadership within the entrepreneurship context.

Regarding gender differences, our findings support the notion that women have on average lower levels of self-efficacy than men, which is in line with previous studies involving students from different fields or at different stages of education (Dempsey & Jennings, 2014; Wilson *et al.*, 2009), including

students from Spain (Díaz García & Jiménez Moreno, 2010). Although the effect size of these differences was fairly low, it is nonetheless an important finding, insofar as perceived self-efficacy is known to play a decisive role in career choice (Lent & Brown, 2019). A more important fact is, perhaps, the fact that the students we surveyed were already beginning their degree studies, which suggests that not enough has been done to foster these young women's creative and entrepreneurial skills and self-perceptions prior to university entry. In this respect, our results support the conclusions of a recent report showing that, despite decades of efforts, there continues to be a gender gap in relation to entrepreneurship (OECD/European Union, 2019). This underlines the importance of identifying not only the factors that may influence the development of entrepreneurial competence among university students but also the extent to which their confidence in their ability to generate new ideas and to take the lead in implementing them might be influenced by sex-role stereotypes within the social context (Mueller & Conway Dato-on, 2013; Ng & Fu, 2018).

Another objective of this study was to analyse the potential mediating role of creative self-efficacy and leadership self-efficacy in the relationship between gender and entrepreneurial self-efficacy. As far as we are aware, this has not previously been examined in the entrepreneurial literature. The results showed that the differences between men and women in entrepreneurial self-efficacy are partially explained by the higher creative self-efficacy of men. According to Huang *et al.* (2022), women's entrepreneurship can be supported by strengthening their perceived capacity to discover, create and make use of entrepreneurial opportunities. In this respect, our empirical findings here suggest that promoting women's confidence in their ability to engage in creative tasks could go some way to closing the gender gap in entrepreneurial self-efficacy.

Contrary to expectations, we did not observe a mediation effect of leadership self-efficacy. Although other authors found leadership to be a factor in the choice of an entrepreneurial career (Obschonka *et al.*, 2017), our results – in what to our knowledge is one of the first studies to specifically explore the relationship between leadership self-efficacy and entrepreneurial self-efficacy – suggest that leadership self-efficacy is not the key variable when it comes to explaining gender differences among undergraduates in entrepreneurial self-efficacy.

Moreover, the results support our fourth hypothesis regarding the influence of the field of study on levels of self-efficacy, suggesting the need to include this variable in future analyses of students' entrepreneurial self-efficacy. Given that perceptions of self-efficacy play a role in career choice (Lent & Brown, 2019), the possible explanation for our findings is that social science and law students do not regard entrepreneurship as being essential to their field. In this regard, it should be noted that research on entrepreneurship suggests that entrepreneurial activity has generally been ignored in non-technical fields of study (Pilegaard *et al.*, 2010), which could have a negative impact on the entrepreneurial vision and attitudes of students (Vázquez-Burguete *et al.*, 2012). In a similar vein, Rafiei *et al.* (2019) argue that entrepreneurship has been more readily incorporated into technical disciplines such as engineering, as opposed to the social sciences, despite the fact that the concept of entrepreneurship has emerged from more socially oriented disciplines such as sociology, psychology, and economic and cultural anthropology (Carlsson *et al.*, 2013). These factors may explain, at least in part, why perceptions of entrepreneurship differ across students from different fields of study (Schediwiy *et al.*, 2018). Whatever the case, the nature of work in all productive sectors is changing (Giones *et al.*, 2020; OECD, 2019), and hence it is important to ensure that students from all backgrounds gain and recognize the value of confidence in their entrepreneurial abilities. For students in fields not traditionally associated with entrepreneurship, this will likely require the design and implementation of specific training initiatives aimed at fostering an entrepreneurial culture and helping them to recognize their potential role as entrepreneurs.

A further contribution of the present study is that we examined whether the field of study had a moderator effect on the relationship between gender and self-efficacy. The analysis revealed that women enrolled in engineering and architecture degrees had similar scores on entrepreneurial self-efficacy to their male peers, whereas women enrolled in social sciences and law degrees scored lower on this variable. This illustrates how gender differences in entrepreneurial self-efficacy depend on the field of study. These findings may partly be explained by the negative impact of gender stereotypes on women's self-perceptions of their ability to follow certain career paths (Tellhed *et al.*, 2017), and in

this respect, it should be noted that our results are consistent with previous studies showing that women students who enter what has traditionally been regarded as male subject areas score higher on self-efficacy than do their female counterparts from other disciplinary fields (Sax & Newhouse, 2019). The role of perceived self-efficacy in career choice (Lent & Brown, 2019) could also be relevant here, insofar as female students who enrol in social sciences and law degrees may not perceive entrepreneurial competence to be necessary for their future professional development.

The aforementioned findings have a number of practical implications. Unlike previous studies, we have explored multiple factors that might influence university students' future entrepreneurial activity, providing a reference for research and relevant policy development. More specifically, we show, in a sample of first-year undergraduates, that fostering students' creative confidence may, in addition to being a relevant educational objective in itself, be a plausible strategy for promoting their entrepreneurial self-efficacy. Our results also suggest the need to design specific educational interventions to improve women's confidence in their entrepreneurial capacity. Efforts should also be made to highlight the value of entrepreneurship in academic fields with which it has not traditionally been associated.

The present study has a number of limitations. Firstly, the sample was recruited from just two Spanish universities and hence it is unclear to what extent the results are generalizable. Although we sought to address this limitation by including a considerable number of students from different disciplines, further studies in other knowledge areas, universities and countries are required to confirm the validity of our findings. A related limitation and possible source of bias is the fact that our data were derived from two cohorts of first-year undergraduates. Future research would therefore need to gather data from a wider variety of groups. In this respect, a longitudinal design would be useful not only to confirm the validity of the present findings but also to examine how students' perceptions of their entrepreneurial abilities evolve across the course of their university studies. It would also be interesting to explore the contextual factors associated with higher entrepreneurial self-efficacy. The research focused on observing the real entrepreneurial behaviours of undergraduates is likewise important for examining the role of self-efficacy in predicting their actual behaviour in non-professional contexts.

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### Conflict of Interest

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

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