

Original

## Gender Disparities and Mental Health Challenges Among Doctoral Candidates

Maidier Prieto-Vila<sup>1</sup>, Francisco José Estupiñá Puig<sup>2</sup>, Marta Evelia Aparicio García<sup>3,4</sup>, Álvaro Santalla<sup>2</sup>, Ana Sanz<sup>5</sup> & Cristina Larroy<sup>2</sup>

<sup>1</sup>Department of Experimental Psychology, Cognitive Processes and Logopedics, Faculty of Psychology, Complutense University of Madrid, Madrid, Spain

<sup>2</sup> Department of Personality, Assessment and Clinical Psychology, Faculty of Psychology, Complutense University of Madrid, Madrid, Spain

<sup>3</sup> Department of Social, Work and Differential Psychology, Faculty of Psychology, Complutense University of Madrid, Madrid, Spain

<sup>4</sup> Institute for Feminist Research, Complutense University of Madrid, Madrid, Spain

<sup>5</sup> Nebrija University, Madrid, Spain

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### A B S T R A C T

**Introduction:** Gender bias in academia persists, affecting women's participation. It is well known that women have less opportunities in comparison with men (i.e. to achieve positions on academia, be awarded with a grant, more difficulties for family-work conciliation, impostor syndrome, etc.) However, to date now, there is little evidence about gender differences among doctoral candidates despite it is a crucial position for the academia's future, but it is evidenced that women have double chances of being distressed than male candidates. **Aim:** identify gender disparities across doctoral candidates. **Methods:** A total of 1010 doctoral candidates (645 women and 365 men) participated on a cross-sectional survey. Statistical analyses, including t-tests and chi-square tests were used to perform a comparison between male and female candidates. **Results:** Female candidates show higher levels of anxiety symptoms, distress, and work-to-family conflict, and were less likely to receive mental health treatment. They also reported lower satisfaction with thesis supervision, recognition, and training and higher levels of regret about starting a PhD. **Conclusions:** These findings highlight the disparities across male and female doctoral candidates in academia and emphasize the need for gender-sensitive policies and support mechanisms for mental health.

## Diferencias de Género y Problemas de Salud Mental entre Estudiantes de Doctorado

### R E S U M E N

**Introducción:** Las diferencias de género en la academia afecta la participación de las mujeres, donde las mujeres tienen menos oportunidades en comparación con los hombres (p.ej. para alcanzar posiciones en la academia, conseguir financiación para proyectos, mayor dificultades para la conciliación familia-trabajo, mayor síndrome del impostor, etc.). Sin embargo, hasta la fecha, hay poca evidencia sobre las diferencias de género entre estudiantes de doctorado a pesar de que es una posición crucial para el futuro de la academia. Aunque existe evidencia que las mujeres tienen el doble de probabilidades de sufrir estrés que los hombres. **Objetivo:** identificar las diferencias de género entre los estudiantes de doctorado. **Método:** Un total de 1010 estudiantes de doctorado (645 mujeres y 365 hombres) participaron en una encuesta de corte transversal. Se utilizaron pruebas t y pruebas de chi-cuadrado para realizar una comparación entre estudiantes según género. **Resultados:** Las doctorandas muestran niveles más altos de síntomas de ansiedad, angustia y conflicto trabajo-familia, y reciben menos tratamiento de salud mental. También informaron una menor satisfacción con la supervisión de tesis, reconocimiento y formación, y niveles más altos de arrepentimiento por comenzar un doctorado. **Conclusiones:** Estos hallazgos resaltan las diferencias según género en estudiantes de doctorado y enfatizan la necesidad de políticas sensibles al género y de apoyo para la salud mental.

#### Palabras clave:

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\* Corresponding author.

E-mail address: [maiderpr@ucom.es](mailto:maiderpr@ucom.es) (M. Prieto-Vila).

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## Introduction

### *Women at the academy*

Gender bias in science has been a persistent issue across history, hindering the full participation of women in research and scientific advancement (Ceci et al., 2023). Traditionally, studies have highlighted the structural discrimination that women suffer in academic settings, as phenomenon known as the “Matilda effect” (Rossiter, 1993).

Despite improvement over the years, the evidence has shown that women are less likely to be awarded with research grants, independently of the quality of their research (Bol et al., 2022) or with *cum laude* distinction on the PhD dissertation (Bol, 2023). Moreover, women encounter challenges in publishing and receiving credit comparable to their male counterparts, which is crucial for advancing in academia, contributing to a gender gap. This publication gap was extensively researched in STEM fields (Ceci et al., 2023) and extends to other disciplines such as Psychology (Mackelprang et al., 2023), Medicine (Hakvoort et al., 2023) or Psychiatry (Borlik et al., 2021). Furthermore, women are also more likely to have lower salaries, higher difficulties to balance their personal and work life, higher risk of discrimination, unequal workloads or higher probabilities to experience harassment (Borlik et al., 2021). Furthermore, it is well-addressed that gender stereotypes internalized by society, which contribute to impostor syndrome among women, persist within academia (Studdard, 2002).

However, it is important to note that much of the existing research on gender bias in academia focuses on higher levels of the academic hierarchy, often overlooking the experiences of female doctoral candidates (Card et al., 2023). Nevertheless, the status of female doctoral candidates is of great importance, as is their mental health and wellbeing. Doctoral candidates are the future of the academy, and the participation of women in research brings better performance for groups and more careful consideration for gender-related issues, which is crucial in social, biological and psychological issues (Hakvoort et al., 2023).

### *Mental health of female doctoral candidates*

There is a growing concern about the mental health status of university students, which has been described as a mental health crisis (Evans et al., 2018). Among students’ population, the wellbeing status of doctoral candidates is particularly worrying. Different reviews conclude that doctoral candidates are at high risk of developing mental disorders, with between 24% and 54% affected by depressive symptomatology, and between 17% and 42% struggling with anxious symptomatology (Hazell et al., 2020; Satinsky et al., 2021). In a Spanish large university, our research team found a 43,6% of doctoral candidates with depressive symptomatology and a 58,7% with anxious symptomatology among a wide sample of doctoral candidates of all branches of knowledge assessed through self-reports (Estupiñá et al., 2024).

Despite these troublesome figures, the position of women among doctoral candidates is of higher risk (Hazell et al., 2020), with female doctoral candidates showing greater levels of depressive and anxious symptoms. In our own previous research, identifying as female doubled the chances of showing clinically significant mental health concerns ( $OR = 2.07$ ; 95%  $IC [1.45-3.0]$ ) (Estupiñá et al., 2024). It is important to underline that the prevalence of women with emotional disorders in general population are higher than in men, but the prevalence among doctoral candidates is greater than in general population (Hazell et al., 2020; Satinsky et al., 2021), even

when controlling for age and educational status (Levecque et al., 2017).

Depression and anxiety have significant impact in the academy, as doctoral candidates with poorer mental health are more likely to drop out, with mental health status being the main predictor of dropout (González-Betancor & Dorta-González, 2020); this leaves female doctoral candidates with a greater risk of dropping out of the academy at the very beginning of their career.

### *Risk factors for poor mental health in doctoral candidates.*

Different factors have been related to this poorer mental health status of female doctoral candidates (Hazell et al., 2020), as was addressed before. However, it is important to consider that women suffer more from internalizing disorders through different cultures and age groups (Gabilondo et al., 2010; Seedat et al., 2009), and are also more like to disclose this kind of symptoms (Mackenzie et al., 2006); while men suffer more from externalizing disorders (Seedat et al., 2009), which are disclosed less frequently.

Other factors have emerged in the effort to understand this negative mental health status of doctoral candidates, both male and female, as academic situation (i.e., thesis supervisor’s leadership style, professional aspirations inside or outside the academy), psychological traits (i.e., emotional regulation and satisfaction with life) and social – organizational characteristics (i.e., work-family conflict, social support, or the burden of bureaucracy) (Estupiñá et al., 2024; Levecque et al., 2017), but they have been rarely considered through the lens of gender differences.

Therefore, the aim of this study is to identify differences between female and male doctoral candidates in social, psychological, and academic factors, building upon the findings of [Estupiñá et al., 2024]. We hypothesize that, compared to males, female doctoral candidates will report lower satisfaction with their thesis supervision, lower expectations regarding their academic future, lower social support, lower satisfaction with life, higher work-family conflict, and increased stress related to academic bureaucracy. Additionally, as a proxy for the increased risk of abandon, we expect women to express greater regrets regarding their choice of director, research topic, and academic career trajectory.

## Methods

### *Design and Participants*

The data used for the current study were collected as a part of Mental Health in Doctoral Students (SMED) study (Estupiñá et al., 2024), where a population of doctoral candidates from a large Spanish university were surveyed in a cross-sectional study using non probabilistic sampling method. A total of 1018 doctoral candidates composed the total sample. All participants gave their written informed consent. The study was approved by the Research Ethics Committee for the University [the reference number will be provided after the peer-review].

For the present study, doctoral candidates were included if they identified as female or male. Eight participants identified as non-binary were excluded due to the small sample size, which would result in low statistical power for analysis. Consequently, a total of 1010 doctoral candidates met the inclusion criteria.

## Procedure

An online survey was developed in Google Forms, limited to one response per individual. This survey was composed after an

initial meeting with the staff of the University's Doctoral School to identify organizational factors that may negatively impact the mental health status of doctoral candidates. The survey encompassed ad hoc inquiries into sociodemographic, academic, and organizational factors, alongside a battery of validated psychometric instruments for assessing mental health-related variables. Prior to distribution on all doctoral programs, a pilot test was conducted on students from a doctoral program (different from Psychology), chosen for convenience. This pilot phase was conducted to obtain qualitative feedback on the survey's design and content, to improve the final version. Afterwards, the survey was distributed to all 56 doctoral programs across the university through email, social media platforms, and the official websites of collaborating university entities. The survey remained open for responses from March 4th to June 4th, 2022. (For more details see Estupiñá et al., 2024).

### Measures

General Health Questionnaire – 12 (GHQ-12; Goldberg & Williams, 1988; Spanish validation: Sánchez-López & Dresch, 2008): Self-administered screening questionnaire for the assessment of psychological distress; 12 items on a Likert scale. Range: 0-36. Internal consistency on the present study:  $\alpha = 0.88$ ;  $\omega = 0.91$

Patient Health Questionnaire-4 (PHQ-4; Kroenke et al., 2009; Spanish validation: Cano-Vindel et al., 2018): Ultra-brief self-report questionnaire for anxious and depressive symptoms; 2 items per subscale on a Likert scale. Range: 0-9 each subscale. Internal consistency on the present study:  $\alpha = 0.86$ ;  $\omega = 0.86$ .

Beck's Depression Inventory, second edition (BDI-II) item 9 (Beck et al., 1996; Spanish validation: Sanz et al., 2003). A single item that probes suicidal ideation. It has adequate sensitivity as an independent measure of suicidal ideation and attempt (Casey et al., 2006). Range: 0-3.

Satisfaction With Life Scale (SWLS; Diener et al., 1985; Spanish validation: Vázquez et al., 2013). Brief instrument to assess satisfaction with life. 5 items with 7 response options. Range: 5-35. Internal consistency on the present study:  $\alpha = 0.88$ ;  $\omega = 0.88$ .

Difficulties in Emotion Regulation Scale-SF (DERS-SF; Gratz & Roemer, 2004; Spanish validation: Navarro Carrascal et al., 2021). Measures difficulties with emotion regulation. Range: 6-90. Internal consistency:  $\alpha = 0.87$ ;  $\omega = 0.89$ .

Work-Family Conflict Questionnaire (WAFCS; Haslam et al., 2015; Spanish validation: Blanch & Aluja, 2009). Assesses work-family conflict. Consists of two 4-item (7-point Likert-type) scales, that measure the degree of work-to-family conflict (WFC) and the degree of family-to-work conflict (FWC). Range: 4-28 each subscale. Internal consistency on the present study:  $\alpha = 0.92$ ;  $\omega = 0.92$ .

Satisfaction with the Thesis Supervisor Scale (*ad hoc* for the current study). Ad-hoc scale made up of six 10-point items that assesses doctoral students' satisfaction with their thesis supervisor. Internal consistency on the present study:  $\alpha = 0.91$ ;  $\omega = 0.91$ .

Others: *Ad hoc* questionnaires were developed to measure sociodemographic data (age, gender, income per month, working situation), reasons for pursuing a PhD, mental health treatment, social support in academia and outside academia and regret about starting a PhD.

**Table 1.**

Descriptive and comparative statistics of the total sample and between female and male for sociodemographic and psychological data.

	Total sample Mean (SD) N (%)	Female (n = 645) Mean (SD) n (%)	Male (n = 365) Mean (SD) n (%)	p-value	Cohen's d (CI) or Cramer's V
<b>Sociodemographic</b>					
Age	31.91 (7.86)	31.67 (7.63)	32.34 (8.24)	.200	-.08 (-.04-.21)
Estimated monthly income	1214.14 (696.47)	1188.98 (624.85)	1260.18 (806.55)	.123	-.1 (-.02-.23)
Works outside academia				.895	.006
Yes	552 (54.7)	354 (64.1)	198 (35.9)		
No	458 (45.3)	291 (63.5)	167 (36.5)		
Contractual relation with the university				.480	.02
Yes	428 (42.4)	268 (62.6)	160 (37.4)		
No	582 (57.6)	377 (64.8)	205 (35.2)		
<b>Clinical and psychological data</b>					
GHQ-12	15.25 (6.66)	16.22 (6.92)	14.29 (6.41)	<.001**	
SWLS total	19.77 (7.11)	19.80 (7.08)	19.73 (7.17)	.881	.01 (-.12-.14)
PHQ-2	2.6 (1.97)	2.66 (1.95)	2.51 (2.01)	.24	.08 (-.05-.2)
GAD-2	3.24 (1.87)	3.47 (1.84)	2.84 (1.85)	<.001**	.34 (.21-.47)
DERS-S SF TOTAL	43.43 (13.6)	43.84 (14.27)	42.72 (12.31)	.192	.08 (-0.5-.21)
Suicidal thoughts				.935	.005
Yes	808 (80)	128 (63.4)	74 (36.6)		
No	202 (20)	517 (64)	291 (36)		
Mental health professional support				.002*	.120
No	613 (60.7)	364 (59.4)	249 (40.6)		
Yes, pharmacological	53 (5.2)	38 (71.7)	15 (28.3)		
Yes, psychological	256 (25.3)	177 (69.1)	79 (30.9)		
Yes, both (psychological and pharmacological)	88 (8.7)	66 (75)	22 (25)		
WAFCS					
Work-to-family conflict	18.48 (7.01)	18.86 (6.92)	17.8 (7.1)	.022*	.15 (-.02-.28)
Family-to-work conflict	7.75 (4.56)	7.83 (4.73)	7.61 (4.25)	.438	.04 (-.08-.17)

Abbreviations: GHQ-12: General Health Questionnaire – 12; PHQ-2: Patient Health Questionnaire, depression subscale; GAD-2: Generalized Anxiety Disorder Scale; DERS-SF: Difficulties in Emotion Regulation Scale; WAFCS: Work-Family Conflict Questionnaire.

**Table 2.**

Descriptive and comparative statistics of the total sample and between female and male for academic and social variables.

	Total sample Mean (SD) N (%)	Female (n = 645) Mean (SD) n (%)	Male (n = 365) Mean (SD) n (%)	p-value	Cohen's d (CI) or Cramer's V
<b>Academic variables</b>					
Reason for pursuing a PhD study				.418	.053
Pursuing an academic career	539 (53.4)	337 (62.5)	202 (37.5)		
Personal development	155 (15.3)	96 (61.9)	59 (38.1)		
Professional non-academic career enhancement	220 (21.8)	151 (68.6)	69 (31.4)		
Unclear reason	96 (9.5)	61 (63.5)	35 (36.5)		
Years of study in doctorate	2.92 (1.54)	2.93 (1.55)	2.9 (1.53)	.796	
Enthusiasm for the subject of the doctoral thesis	7.89 (2.16)	7.89 (2.17)	7.9 (2.15)	.973	-.01 (-.13-.12)
Perceived likelihood of pursuing an academic career	4.71 (2.71)	4.57 (2.72)	4.96 (2.67)	.024*	.14 (.02-.27)
<b>Variables related with thesis supervisor</b>					
General Satisfaction with the thesis supervisor	7.52 (2.7)	7.41 (2.74)	7.72 (2.54)	.065	-.06 (-.06-.19)
Satisfaction with the level of involvement of the thesis supervisor	7.2 (2.78)	7.14 (2.8)	7.32 (2.74)	.338	.12 (-.01-.24)
Student satisfaction with their thesis supervisor's willingness to engage in dialogue	6.4 (3.58)	6.46 (3.49)	6.3 (3.73)	.482	.05 (-.08-.17)
Satisfaction with the degree of recognition given by the thesis supervisor	7.32 (3.09)	7.16 (3.15)	7.61 (2.96)	.021*	-.15 (-.02--.27)
Satisfaction with the training offered to students by the thesis supervisor	7.21 (2.95)	7.03 (3.03)	7.53 (2.78)	.004*	-.17 (-.04--.3)
Satisfaction with the thesis supervisor's interest in the student's professional future	6.73 (3.14)	6.59 (3.15)	6.96 (3.11)	.071	-.12 (-.01-.24)
Satisfaction with the competence of the doctoral thesis supervisor	8.2 (2.3)	8.14 (2.43)	8.32 (2.1)	.188	-.08 (-.09-.21)
Enthusiasm for the subject of the doctoral thesis	7.89 (2.16)	7.89 (2.17)	7.9 (2.15)	.973	-.01 (-.13-.12)
<b>Social and organizational variables</b>					
Social support received outside academia	7.67 (2.38)	7.71 (2.4)	7.59 (2.35)	.452	.05 (-.07-.18)
Social support received within academia	5.93 (3.01)	5.83 (2.98)	6.11 (3.05)	.166	-.09 (-.22-.04)
Regret about starting doctoral studies	3.18 (3.15)	3.39 (3.24)	2.8 (2.95)	.033*	.19 (.06-.32)
Negatively affected by the procedures involved in the doctorate	7.25 (2.86)	7.43 (2.75)	6.93 (3.03)	.004*	.17 (.05-.3)
Desire to change thesis supervisor	3.11 (3.21)	3.19 (3.25)	2.97 (3.15)	.305	.07 (-.06-.19)
Worried about losing tuition rights	7.24 (3.03)	7.56 (2.8)	6.67 (3.31)	.001**	.3 (.17-.42)

### Data analysis

To assess differences between male and female candidates, Student's *t* and chi square test were employed for quantitative and qualitative variables respectively. The internal consistency of the psychometric measures were tested with Cronbach's alpha ( $\alpha$ ) and McDonald's omega ( $\omega$ ) tests (Doval et al., 2023). Normality and homoscedasticity tests were also conducted to verify the parametric assumptions. SPSS version 27 was used for the analyses (IBM Corp., 2020).

## Results

### Descriptive Statistics

The average participant in the study identified as woman (63.9%); aged 31.91 ( $SD = 7.9$ ) years; with monthly salary of €1214 ( $SD = 696.47$ ); and with a job outside academia (54.7%). In terms of clinical variables, 59.4% meet the criteria for psychological distress; 58.6% report anxiety symptoms; 43.6% depressive symptoms and 20% of the sample had shown presence of suicidal thoughts, but only 1.6% communicated active ideation. About 39.4% received mental health treatment, with psychological treatment being the most common (25.3%). Regarding academic variables, 42.4% had a contractual relation with the university. The motivation of pursuing a doctorate was to develop an academic career for 53.4% of the sample. Overall satisfaction with thesis supervisors was 7.52 ( $SD = 2.7$ , range: 0-10). The social support outside academia was rated at 7.67 ( $SD = 2.38$ , range: 0-10) and in academia at 5.93 ( $SD$

= 3.01, range: 0-10). Doctoral candidates scored 7.24 ( $SD = 3.03$ , range: 0-10) about worrying about losing tuitions rights and rated at 7.25 ( $SD = 2.86$ , range: 0-10) the burden on wellbeing caused by bureaucratic. Besides, regarding the difficulties reconciling work and family life, doctoral candidates scored 18.48 ( $SD = 7.01$ , range: 4-28). For further details see tables 1 and 2.

### Comparison between female and male doctoral candidates

The results of inferential statistics tests between female and male doctoral candidates illustrated gender differences, where female candidates showed higher scores on anxiety symptoms (female:  $M = 3.47$ ,  $SD = 1.84$ ; male:  $M = 2.84$ ,  $SD = 1.85$ ;  $p < .001^{**}$ ), distress (female:  $M = 16.22$ ,  $SD = 6.92$ ; male:  $M = 14.29$ ,  $SD = 6.41$ ;  $p < .001^{**}$ ), and work-to-family conflict (female:  $M = 18.86$ ,  $SD = 6.92$ ; male:  $M = 17.8$ ,  $SD = 7.1$ ;  $p = .004^*$ ). Also, women were more likely to receive treatment for their mental health ( $\chi^2 = 14.57$ ;  $p = .002^*$ ) relative to male candidates. For detailed information see Table 1.

Also, women showed lower scores of satisfaction with the training offered by the thesis supervisor (female:  $M = 7.03$ ,  $SD = 3.03$ ; male:  $M = 7.53$ ,  $SD = 2.78$ ;  $p = .004^*$ ), recognition given by their supervisor (female:  $M = 7.16$ ,  $SD = 3.15$ ; male:  $M = 7.61$ ,  $SD = 2.96$ ;  $p = .021^*$ ), on the perceived likelihood of pursuing an academic career (female:  $M = 4.57$ ,  $SD = 2.72$ ; male:  $M = 4.96$ ,  $SD = 2.67$ ;  $p = .024^*$ ). Women scored higher on regrets about starting doctoral studies (female:  $M = 3.39$ ,  $SD = 6.92$ ; male:  $M = 2.8$ ,  $SD = 2.95$ ;  $p = .033^*$ ); being burdened by bureaucratic procedures (female:  $M = 7.43$ ,  $SD = 2.75$ ; male:  $M = 6.93$ ,  $SD = 3.03$ ;  $p = .004^*$ ); and worry



on losing tuitions rights (female:  $M = 7.56$ ,  $SD = 2.8$ ; male:  $M = 6.67$ ,  $SD = 3.31$ ;  $p < .001^{**}$ ). For detailed information see [Table 2](#).

## Discussion

### Main results

Data indicate that doctoral candidates are at risk of experiencing mental health difficulties across their doctoral process. Around half of the doctoral candidates have indicators of poor mental health, mostly marked by psychological distress and anxiety symptoms. Although the prevalence of depressive symptoms and suicidal thoughts are lower, they are equally worrisome because of the impact they could have on the mental health of the candidates. Similarly, the proportion of candidates receiving mental health treatment (39.4%) is indicative of the stressful situation in which they are immersed in the development of a doctoral thesis. On average, candidates generally express satisfaction with the supervision provided by their thesis supervisors and the support they receive within and outside the academic community.

In the comparison of the data between male and female participants, it becomes evident that women face a more concerning situation within this sample. Female candidates exhibited higher scores on anxiety symptoms, distress, work-to-family conflict, regret about starting doctoral studies, negative impacts from bureaucratic procedures, and concerns about losing tuition rights. Consistently, being at greater risk of poor mental health, women are more likely to receive treatment for their mental health issues. This finding is coherent with patterns observed in the general population, where women typically seek and receive psychological treatment more often ([Spanish Ministry of Health, 2022](#)).

One factor that may contribute to the poorer mental health outcomes for women is the issue of work-family conflict. The data indicate that female candidates experience greater difficulty in balancing their work and family responsibilities, which could lead to higher levels of anxiety and depression due to the pressure of meeting all required obligations. This finding is significant as it emerges early in life and significantly impacts women, consistently with previous studies conducted in our country ([López-Núñez et al., 2021](#)).

Furthermore, the perception of the support of their thesis supervisors, while being positive, is also worse for women candidates, including the recognition received. This could contribute to have a lower perception of the possibilities of developing an academic career. It is important to note that during the doctoral process, the mentoring and support from the thesis supervisor and consequently a successful mentoring process is associated with a higher probability of publication and support from the research lab. The results of the current study are in the line of previous research that shows that women are less likely to receive attention and support from their thesis supervisor ([Card et al., 2023](#); [Borlik et al., 2021](#)). Less attention could be linked with the influence of gender stereotypes on the part of the dissertation supervisor, with women being perceived as less capable of completing a doctoral dissertation ([Studdard, 2002](#)), which should be analyzed in future studies.

### Limitation and strengths

Our study contributes to understanding the gender differences among doctoral candidates in a large sample size. This collective of researchers is understudied in previous gender research despite being the earliest stage on academia. For the development of this

study, validated psychometric instruments were employed and tested before in a small sample of doctoral candidates. However, despite its strengths, this study has limitations that must be considered. The study was conducted in one university and non-binary doctoral candidates were excluded due to the small sample size ( $n = 8$ ) and associated lack of power to perform analysis. Also, the sample of the current study has higher percentage of women (63.9%) than the doctoral candidates at Complutense University of Madrid (53.9%) with significant statistical differences ( $\chi^2 = 35.2722$ ,  $p < .001^{**}$ ). Therefore, these may limit the generalizability of our findings. Also, it must be considered that the supervisor's related measures are self-reported and were developed specifically for the current study. Although the scale was not validated, it has shown good internal consistency.

## Conclusions

The present study underlines the gender differences between female and male doctoral candidates. These findings highlight that women have higher risk of experiencing emotional disorders during the doctoral process and a lower perception of their possibilities to succeed at academic career. Additionally, it was found that women also perceive lower levels of recognition and training from their supervisors and are more likely to be negatively affected by bureaucratic procedures.

Therefore, these results imply the need of cultural change regarding women's capabilities in academic environments, addressing the importance of continuing with the creation of more egalitarian policies in academia to address the gender gap at this starting point of the academic career (i.e. controlling if thesis supervisors provide equal opportunities regardless the gender, improvements of politics to family-work conciliation). The need to integrate the gender dimension in research for doing better science and introduce gender-structural change in universities is a challenge not yet achieved in academia ([Bustelo, 2023](#)). Despite the improvements, the findings of this study have shown that there are still barriers for women in academia.

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## Declaration of Interests

The authors declare that there is no conflict of interest.

## Data Availability Statement

Data are available online under the following reference: Estupiñá, F. J., Santalla, Á., Prieto, M., Sanz, A., & Larroy, C. (2023, July 31). Mental health in doctoral students. Retrieved from [osf.io/9jsez](https://osf.io/9jsez).

## References

- Blanch, A., & Aluja, A. (2009). Validation study of the Spanish Version of the Work-Family Conflict Questionnaire (CCTF). *The Spanish Journal of Psychology*, 12(2), 746-755. <https://doi.org/10.1017/S1138741600002110>
- Bol, T. (2023). Gender inequality in cum laude distinctions for PhD students. *Scientific Reports*, 13(1), 1-9. <https://doi.org/10.1038/s41598-023-46375-7>
- Bol, T., de Vaan, M., & van de Rijt, A. (2022). Gender-equal funding rates conceal unequal evaluations. *Research Policy*, 51(1), 104399. <https://doi.org/10.1016/j.respol.2021.104399>
- Borlik, M. F., Godoy, S. M., Wadell, P. M., Petrovic-Dovat, L., Cagande, C. C., Hajirnis, A., & Bath, E. P. (2021). Women in Academic Psychiatry: Inequities, Barriers, and Promising Solutions. *Academic Psychiatry*, 45(1), 110-119. <https://doi.org/10.1007/s40596-020-01389-5>
- Bustelo, M. (2023). Corrigendum: Resilience and Gender-Structural Change in Universities: How Bottom-Up Approaches Can Leverage Transformation When Top-Level Management Support Fails. *Sociologica*, 17(3), 179-179. <https://doi.org/10.6092/issn.1971-8853/18782>
- Cano-Vindel, A., Muñoz-Navarro, R., Medrano, L. A., Ruiz-Rodríguez, P., González-Blanch, C., Gómez-Castillo, M. D., Capafons, A., Chacón, F., & Santolaya, F. (2018). A computerized version of the Patient Health Questionnaire-4 as an ultra-brief screening tool to detect emotional disorders in primary care. *Journal of Affective Disorders*, 234, 247-255. <https://doi.org/10.1016/j.jad.2018.01.030>
- Card, D., DellaVigna, S., Funk, P., & Iriberry, N. (2023). Gender gaps at the academies. *Proceedings of the National Academy of Sciences of the United States of America*, 120(4), e2212421120. <https://doi.org/10.1073/pnas.2212421120>
- Carrascal, O. N., Restrepo-Ochoa, D. A., Rommel, D., Ghalaret, J., & Fleury-Bahi, G. (2021). Validación de una versión breve de la Escala de Dificultades en la Regulación Emocional con población hispanohablante (DERS-S SF). *CES Psicología*, 14(2), 71-88. <https://doi.org/10.21615/cesp.5360>
- Casey, P. R., Dunn, G., Kelly, B. D., Birkbeck, G., Dalgard, O. S., Lehtinen, V., Britta, S., Ayuso-Mateos, J. L., Dowrick, C., & Group, O. (2006). Factors associated with suicidal ideation in the general population: five-centre analysis from the ODIN study. *British Journal of Psychiatry*, 189, 410-415. <https://doi.org/10.1192/bjpp.bp.105.017368>
- Ceci, S. J., Kahn, S., & Williams, W. M. (2023). Exploring Gender Bias in Six Key Domains of Academic Science: An Adversarial Collaboration. *Psychological Science in the Public Interest*, 24(1), 15-73. <https://doi.org/10.1177/15291006231163179>
- Diener, E., Emmons, R. A., Larsen, R. J., & Griffin, S. (1985). The Satisfaction With Life Scale. *Journal of Personality Assessment*, 49(1), 71-75. [https://doi.org/10.1207/s15327752jpa4901\\_13](https://doi.org/10.1207/s15327752jpa4901_13)
- Doval, E., Viladrich, C., & Angulo-Brunet, A. (2023). Coefficient Alpha: The Resistance of a Classic. *Psicothema*, 35(1), 5-20. <https://doi.org/10.7334/psicothema2022.321>
- Estupiñá, F. J., Santalla, A., Prieto-Vila, M., Sanz, A., & Larroy, C. (2024). Mental health in doctoral students: Individual, academic, and organizational predictors. *Psicothema*, 36(2), 123-132. <https://doi.org/10.7334/psicothema2023.156>
- Evans, T. M., Bira, L., Gastelum, J. B., Weiss, L. T., & Vanderford, N. L. (2018). Evidence for a mental health crisis in graduate education. *Nature Biotechnology*, 36(3), 282-284. <https://doi.org/10.1038/nbt.4089>
- Gabilondo, A., Rojas-Farreras, S., Vilagut, G., Haro, J. M., Fernández, A., Pinto-Meza, A., & Alonso, J. (2010). Epidemiology of major depressive episode in a southern European country: Results from the ESEMeD-Spain project. *Journal of Affective Disorders*, 120(1), 76-85. <https://doi.org/10.1016/j.jad.2009.04.016>
- González-Betancor, S. M., & Dorta-González, P. (2020). Risk of Interruption of Doctoral Studies and Mental Health in PhD Students. *Mathematics*, 8(10), 1695. <https://doi.org/10.3390/math8101695>
- Goldberg, D., & Williams, P. (1988). *General Health Questionnaire (GHQ)*. NFER-Nelson.
- Gratz, K. L., & Roemer, L. (2004). Multidimensional Assessment of Emotion Regulation and Dysregulation: Development, Factor Structure, and Initial Validation of the Difficulties in Emotion Regulation Scale. *Journal of Psychopathology and Behavioral Assessment*, 26(1), 41-54. <https://doi.org/10.1023/B:JOBA.0000007455.08539.94>
- Hakvoort, K., Conzen-Dilger, C., Gutzmann, A., Losse, E., Tauber, S. C., Chechko, N., & Höllig, A. (2023). Is there a gender gap in clinical neurosciences? A cross-sectional analysis of female participation in academic neurology, neurosurgery, and psychiatry. *Neuroscience & Biobehavioral Reviews*, 155, 105458. <https://doi.org/10.1016/j.neubiorev.2023.105458>
- Haslam, D., Filus, A., Morawska, A., Sanders, M. R., & Fletcher, R. (2015). The Work-Family Conflict Scale (WAFCS): Development and Initial Validation of a Self-report Measure of Work-Family Conflict for Use with Parents. *Child Psychiatry & Human Development*, 46(3), 346-357. <https://doi.org/10.1007/s10578-014-0476-0>
- Hazell, C. M., Chapman, L., Valeix, S. F., Roberts, P., Niven, J. E., & Berry, C. (2020). Understanding the mental health of doctoral researchers: a mixed methods systematic review with meta-analysis and meta-synthesis. *Systematic Reviews*, 9(1), 197. <https://doi.org/10.1186/s13643-020-01443-1>
- IBM Corp. (2020). *IBM SPSS Statistics for Macintosh, Version 27.0*.
- Kroenke, K., Spitzer, R. L., Williams, J. B. W., & Löwe, B. (2009). An Ultra-Brief Screening Scale for Anxiety and Depression: The PHQ-4. *Psychosomatics*, 50(6), 613-621. [https://doi.org/10.1016/S0033-3182\(09\)70864-3](https://doi.org/10.1016/S0033-3182(09)70864-3)
- Levecque, K., Anseel, F., De Beuckelaer, A., Van der Heyden, J., & Gisle, L. (2017). Work organization and mental health problems in PhD students. *Research Policy*, 46(4), 868-879. <https://doi.org/10.1016/j.respol.2017.02.008>
- Mackelprang, J. L., Johansen, E. E., & Orr, C. (2023). Gender disparities in authorship of invited submissions in high-impact psychology journals. *The American Psychologist*, 78(3), 333-345. <https://doi.org/10.1037/amp0001106>
- Mackenzie, C. S., Gekoski, W. L., & Knox, V. J. (2006). Age, gender, and the underutilization of mental health services: The influence of help-seeking attitudes. *Aging & Mental Health*, 10(6), 574-582. <https://doi.org/10.1080/13607860600641200>
- Ministerio de Sanidad [Ministry of Health] (2022). *Estrategia de salud mental del Sistema Nacional de Salud [National Health System Mental Health Strategy]*. Retrieved from: [https://www.sanidad.gob.es/areas/calidadAsistencial/estrategias/saludMental/docs/Ministerio\\_Sanidad\\_Estrategia\\_Salud\\_Mental\\_SNS\\_2022\\_2026.pdf](https://www.sanidad.gob.es/areas/calidadAsistencial/estrategias/saludMental/docs/Ministerio_Sanidad_Estrategia_Salud_Mental_SNS_2022_2026.pdf)
- Rossiter, M. W. (1993). The Matthew Matilda Effect in Science. *Social Studies of Sci*, 23(2), 325-341. <https://doi.org/10.1177/030631293023002004>
- Sánchez-López, M. d. P., & Dresch, V. (2008). The 12-Item General Health Questionnaire (GHQ-12): reliability, external validity and factor structure in the Spanish population. *Psicothema*, 20(4), 839-843.
- Sanz Fernández, J., Vázquez Valverde, C., & Perdigón, A. L. (2003). Adaptación española del Inventario para la Depresión de Beck-II (BDI-II): 2. Propiedades psicométricas en población general [Spanish adaptation of the Beck Depression Inventory-II (BDI-II): 2. Psychometric properties in the general population]. *Clínica y Salud: Investigación Empírica en Psicología*, 14(3), 249-280. <https://dialnet.unirioja.es/servlet/articulo?codigo=787497>
- Satinsky, E. N., Kimura, T., Kiang, M. V., Abebe, R., Cunningham, S., Lee, H., Lin, X., Liu, C. H., Rudan, I., Sen, S., Tomlinson, M., Yaver, M., & Tsai, A. C. (2021). Systematic review and meta-analysis of depression, anxiety, and suicidal ideation among Ph.D. students. *Scientific Reports*, 11(1), 1-12. <https://doi.org/10.1038/s41598-021-93687-7>
- Seedat, S., Scott, K. M., Angermeyer, M. C., Berglund, P., Bromet, E. J., Brugha, T. S., Demyttenaere, K., de Girolamo, G., Haro, J. M., Jin, R., Karam, E. G., Kovess-Masfety, V., Levinson, D., Medina Mora, M. E., Ono, Y., Ormel, J., Pennell, B., Posada-Villa, J., Sampson, N. A., . . . Kessler, R. C. (2009). Cross-National Associations Between Gender and Mental Disorders in the World Health Organization World Mental Health Surveys. *Archives of General Psychiatry*, 66(7), 785-795. <https://doi.org/10.1001/archgenpsychiatry.2009.36>
- Studdard, S. S. (2002). Adult women students in the academy: Impostors or members?. *The Journal of Continuing Higher Education*, 50(3), 24-37. <https://doi.org/10.1080/07377366.2002.10401202>
- Vázquez, C., Duque, A., & Hervás, G. (2013). Satisfaction with Life Scale in a Representative Sample of Spanish Adults: Validation and Normative Data. *The Spanish Journal of Psychology*, 16, E82. <https://doi.org/10.1017/sjp.2013.82>