Title: Feminization of the precarious at the UNAM: examining obstacles to gender equality

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Abstract

In this article we seek a better understanding of the specificities of the gender gap, regarding the reality of women in the different disciplines contained in STEM within Latin America. Specifically, we analyze and compare the situation of women in the Institutes of Mathematics, Ecology and Biology, belonging to the National Autonomous University of Mexico (UNAM). In this novel study, we contribute to deepen in how the phenomena of horizontal and vertical segregation are combined with symbolic and structural obstacles, as well as economic-labor precariousness, within the framework of gender norms. We also analyze the points in common regarding the situation in the Global North. We consider that these facts are fundamental to understand how gender stereotypes are perpetuated in the production of knowledge, and what are the values implied in gender norms that explain the exclusion, and self-exclusion, of women in certain disciplines and statuses. Related to this, we inquired into the relationship between these values and the cultural capital represented in each of the disciplines mentioned and found that the knowledge areas that currently represent the highest cultural capital pose symbolic obstacles for women. Conversely, those

areas that less strongly embody values associated with masculinity, and therefore have less cultural capital, present mainly structural obstacles for women.

Introduction

The acronym STEM (Science, Technology, Engineering, and Mathematics) was introduced to the United States by the National Science Foundation in the year 2000 to encourage interest in the disciplines it encompasses [1]. This promotion arises from the increasing demand for scientific and technological education, driven by the constant changes in technology and the growing digitalization of contemporary societies [2]. Nonetheless, workforce representation in STEM is characterized by a strong gender disparity, with the under-representation of women [3].

It is important to note that systematic study aimed at highlighting the absence of women in science and technology predates the development of STEM as a concept, since such study began back in the 1990s [3]. Subsequently, studies that problematize the place of women in science have rapidly increased. In the last decade, <50,000 articles covering various disciplines such as psychology, economics, biology, physics, education, mathematics, and more have been published [4].

In the context of such disciplinary diversity, the gender gap within STEM has become especially notable due to the 'horizontal segregation' that characterizes these disciplines; that is, an absence, or limited presence, of women in such careers as compared to men. Since the STEM sector is expected to generate the highest demands for labor, 45% in 2022 [5] and given that many institutions, companies, and organizations affirm that 'the future lies in digitally boosting the world's economies' [2], there is a clear convergence between socio-economic status and the gender gap in these disciplines.

Given that bachelor's degrees in life and social sciences are now evenly distributed between women and men, some authors use the term pSTEM to clarify that 'science' does not refer to biology and chemistry, but particularly to the field of physics, where women are most underrepresented compared to the other disciplines mentioned [6]. We will follow this distinction. We emphasize that currently, the extensive amount of literature on the topic of women in science in general, and in STEM in particular, does not fulfill the analytical needs to attain a comprehensive analysis of the subject. Also, as a result of the literature search, we conducted for this research, we identified a lack of Latin American studies that problematize the relationship between women and STEM, with some exceptions.[7] However, comparative analysis aiming to understand differences between STEM departments within universities in Latin America remains to be elucidated. This approach is essential for two reasons: first, to contribute to a better understanding of the specificities of the gender gap regarding the reality of women in the different disciplines contained in STEM within our region; and second, to analyze commonalities regarding the situation in

the Global North. These points are essential in understanding how gender norms operate to exclude women from certain contexts.

Consequently, our research efforts focused on systematizing this approach at the National Autonomous University of Mexico (UNAM). In this university, previous works have demonstrated an asymmetric distribution of women compared to their male counterparts is observed in the former area, while the latter usually reveals an even distribution of women and men among the academic staff [8]. Regardless of the disciplinary area, it has also been observed that women's academic careers are affected: generally speaking, it is men who become senior researchers, and in a shorter period, as it takes longer for women to be promoted, both in research careers and in the associated incentives [8]. The conclusion reached is that female researchers are, on the one hand, less represented at the highest levels of appointment and, on the other, in the field of scientific research in general. The combination of both facts results in a marked segregation of women in specific spaces [8].

This study aims to untangle this gap in four departments of the UNAM that belong to the fields of Exact and Natural Sciences. We conducted a comparative analysis that takes into account how horizontal segregation (fewer women in occupational areas considered 'masculine') and 'vertical segregation' (the absence of women in senior posts) interact, and, at the same time, their relationship with the socio-economic status of academic personnel. To do this, we selected a representative pSTEM institution, the Institute of Mathematics, and two other institutions of STEM, where, due to the increasing number of women no horizontal segregation is observed: the Institute of Biology and the Institute of Ecology.

Traditional approaches suggested that when there are fewer women as compared to men within an institution, they are in a worse situation as compared to centers where they are more represented. Contrary to this reading, we hypothesized that, although there are few women in the pSTEM, they are not in a situation of inequality in relation to men. We begin by associating pSTEM as the core area where values typically associated with masculinity are concentrated: objectivity, neutrality, abstraction, reason, and universality [9–11]. At the same time, we characterized these disciplines as having the highest economic and cultural capital, meaning that the knowledge produced by these disciplines is the most highly valued in economic, political, and social terms.

In addition, in pSTEM disciplines values usually associated with femininity, such as emotion, sensitivity, and empathy, are typically excluded [12–14]. Consequently, they incorporate 'symbolic barriers' that hinders women from entering these spaces (which means that it is not common for women to associate with these disciplines as their identity as women/feminine conflicts with the values that these disciplines demand). However, once these barriers are partially overcomed, i.e., when women develop an interest in pSTEM, advancement comparable to that of men entails fewer complications as compared to disciplines where there is no horizontal segregation. In other words, due to the symbolic

barriers that discourage women from engaging with pSTEM disciplines, horizontal segregation mitigates vertical segregation. We believe that these types of knowledge amount to an epistemic authority in themselves, and although this authority is certainly intertwined with gender inequalities, once women achieve this knowledge, they also attain epistemic authority, as this knowledge involves economic and cultural capital .

We maintain that the mitigation of horizontal segregation found in disciplines such as Ecology and Biology is reflected in increased vertical segregation. Structural obstacles are likely to be clearer, namely, concrete obstacles that prevent women from gaining senior appointments due to the gender norms and stereotypes that hinder their academic-professional growth, even when they have the same knowledge as their male counterparts. In other words, since the values associated with these disciplines (a direct interest in life and the environment) are less masculinized, they produce knowledge that has less economic and cultural capital. Consequently, gender inequality results in men occupying the best positions. Accordingly, epistemic authority in this type of knowledge is legitimized by the academic status of its researchers.

When we refer to ‘positions’, we mean social status and economic income, that is, if the pay gap is gendered [4,15,16]. We believe this kind of gendered gap will be different for each scientific discipline, depending on which values those disciplines embody and the consequent economic and cultural capital associated with them. In our view, horizontal and vertical segregation intertwine with the symbolic and structural barriers that women face in our androcentric societies. By androcentric societies, we mean a value system where, as already described, masculinity is more valued and, in turn, values associated with masculinity are identified with those spaces and knowledge that garner greater economic and cultural capital.

For this reason, we believe that the underrepresentation of women in pSTEM is intrinsically linked to their overrepresentation in disciplines involving communal roles associated with femininity, such as nursing and primary and secondary education. The pay gap in annual salary between an engineer and a nurse, even where both involve a similar educational commitment, and where nursing hours are more demanding, is linked to the gendering values of these disciplines [15].

Following this, we aim to show that inequality not only depends on ‘where women are’ but, at the same time, ‘where men are.’ In this sense, we emphasize that policies for the inclusion of women in science have not been matched by policies for the inclusion of men in communal roles. This fact explains why, between 1995 and 2013, there was an increase in women involved in male-dominated occupations but virtually no change in men's participation in female-dominated occupations [15].

The feminization of these communal tasks explains their ‘precarization’, and vice versa. In line with new feminist materialisms and the epistemologist Donna Haraway [17,18], we

interpret events on the basis of the mutual interaction of the factors that constitute them. Thus, precarization and feminization occur simultaneously; neither of these two features precedes the other but they are, rather, co-constructed. Values associated with femininity are devalued, while at the same time being considered necessary for communal roles. In summary, just as the masculinization and overvaluation of occupations associated with pSTEM co-arise, so do the feminization and precarization of occupations that embed female overrepresentation.

We believe that both the symbolic aspects - that involve associating a person's gender identity with certain values, associated in turn with certain occupations and interests -, as well as structural-physical aspects - which involve academic-professional growth - lead us to question not only where women are not but, at the same time, where men are not. We argue it is necessary to focus on 'gender relations' that underlie inequality between men and women based on a hierarchical evaluation of bodies.This is why we refer to the barriers and privileges, both structural and symbolic, that explain the underrepresentation of women and the overrepresentation of men in certain scientific disciplines.

This study seeks to test the hypothesis mentioned above, which described in detail is as follows: where there is horizontal segregation, vertical segregation is softened because symbolic barriers prevail. In contrast, where there is no horizontal segregation, vertical segregation intensifies, as structural barriers take the lead. In summary, we will evaluate the relationship between these modes of segregation and the values associated with the disciplines pursued in the three institutes already mentioned (Institute of Biology, Institute of Ecology, Institute of Mathematics at UNAM). This will be measured in terms of their being more or less masculinized and, consequently, their level of cultural capital (i.e., the epistemic authority implied in the knowledge generated in each discipline, including their social and economic status), and the level of precarization among female academic staff.

Results

Regarding the total academic population, the Institute of Biology (IB) has 71 people whose names were associated with the feminine names (f) and 90 with the masculine names (m). Particularly, we registered 75 people (24f, 51m) as research personnel. For the Institute of Ecology (IE), we recorded 44 f and 36 m, out of which 45 (23f and 22m) corresponded to the category of research personnel. Lastly, in the Institute of Mathematics (IM), we counted 28 f and 88 m, out of which 95 (22f and 73m) were identified as research personnel (Supplementary Table 1).

The average age within the tree institutes is similar (IB = 56.57, IE = 56.81, IM = 56.65). The two institutes with the largest difference in the average age between feminine and masculine are IE and IM (6 - 7 years apart); IB presents a difference of approx. 2 years (Supplementary figure 1). It is worth noting that feminine or masculine age distribution do not present obvious differences for the tree Institutes (Supplementary figure 2)

In terms of the economic remuneration, the highest level for technical personnel is equivalent to the lowest position for research personnel (Suppl. Table 2).

With respect to the proportional distribution of the highest levels of A&IP (Academic and Incentive Programs) for the research personnel (Figure 1, Supplementary figure 3) we observed that the IE has the greatest gender differences for the "Titular C" academic position and for the highest position in the incentive programs (PRIDE D and SNI III). Whereas the IM showed an equivalent proportional distribution, but lower in SNI III level. Regarding the Emeritus honorary title (within both academic positions and the SNI incentive program), we did not register feminine names, except for the SNI in IM (Figure 2).

Nonetheless, we observed differences in the average time for promotion in research personnel, being higher for the feminine names than for the masculine names (Supplementary figure 4) in academic positions, with some exceptions in the incentive programs (PRIDE and SNI). It is important to emphasize that higher levels within both academic and the incentive programs, constitute an important difference in remunerations (Supplementary figure 5).

Discussion

Gender relations are differentially represented in the analyzed institutions, as the proportion of women and men is characteristic to each of them. The diagnosis of the IM as a pSTEM, matches the equal/unequal distribution of their personnel in terms of gender. The very concept of pSTEM indicates that disciplines such as Biology and Ecology are not included in those characterized as revealing horizontal segregation, something that we corroborate in this study.

At the same time, we detected a significant representation of women in the category of academic technical staff in the IE and IB (Supplementary Table 1), and the economic precariousness associated with this category (Supplementary Table 2). In this line, the masculinization of academic technical staff in the IM reflects the linkage between the cultural capital of that discipline with associated male values. In other words, it reflects the symbolic obstacles women face in relating to this area of knowledge. That is why, in this case, horizontal segregation is evident, even in the technical-academic staff, which implies lower incomes.

In relation to academic posts and the phenomenon of horizontal segregation which is not observed in the IE and IB, we confirm the accentuation of vertical segregation (Figure 1). In other words, the percentage of women in the highest positions – Titular C and Emeritus - and with the highest incentives - Pride C, SNI III, and SNI Emeritus - is lower than the percentage of men. That is, structural obstacles prevail within these disciplines, whose values are less masculinized and, therefore, have a lower level of cultural capital [11,15]. In

sum, the status in the IE and IB is mainly influenced by the position occupied by each member of the academic staff, and not by the disciplines addressed in these institutes.

In the case of the IM, where horizontal segregation is evident (Supplementary Table 1), we observed a dilution of vertical segregation. In other words, the percentage of women in the Titular C and with higher incentives - Pride C, SNI III, and SNI Emeritus - (Figure 1 and Figure 2) is similar in almost all cases to the percentage of men. In SNI Emeritus, there are more women. This reflects the prevalence of symbolic obstacles, i.e., the lesser interest that women have in disciplines strongly associated with masculinized values such as objectivity, neutrality, and abstraction [9,11,19]. However, we mention that vertical segregation 'does not disappear', as reflected in the absence of women Emeritus academic position and fewer Emeritus women in SNI III (Figure 2), but is greatly diminished in relation to the IE and IB.

This phenomenon, which confirms that horizontal segregation is directly proportional to symbolic barriers and implies a reduction of vertical segregation, is consistent with a recent meta-analysis that reviewed numerous articles and found that in the United States and Europe, '...in tenure-track hiring, our national cohort analyses show no increased likelihood that men proceed to tenure-track jobs relative to women in the very fields in which women are most underrepresented (GEMP), although there is a difference in LPS fields' (GEMP = geoscience, engineering, economics, mathematics, computer science, and physical science; LPS = life sciences, psychology/behavioral sciences, and social sciences) [4].

At the same time, according to the data from the IE and IB (Supplementary table 1, Fig. 1 and 2), we confirmed that vertical segregation is directly proportional to structural barriers and implies a reduction of horizontal segregation. In these less valued areas - because they are less associated with masculine values and therefore have less cultural capital - the gender hierarchy is reflected in how women are placed in these spaces: that is, more precarious, as their lower-status posts and incentives result in lower income (Supplementary figure 5). Such female-dominated disciplines have been reported associated with lower success rates. [20]

In contrast, when obstacles are symbolic, the hierarchy is reflected in the absence of women and male overrepresentation. In these areas of knowledge with significant cultural capital, the highest posts are less biased for gender reasons: precarization in these cases is shown in the exclusion of women from these types of disciplines. However, we again emphasize that vertical segregation also exists, albeit to a very lesser extent.

It is important to mention that we have found, in line with previous studies [8], that women delay their academic promotion in the three institutes (Supplementary figure 4). This reflects a combination of structural and symbolic obstacles. The former is because women must reconcile their academic-professional life with their family life, a tension not experienced by their male counterparts [19]. This can result in women taking longer to seek

category changes; to produce more publications and gain teaching experience, etc. Regarding the symbolic obstacles, women are more insecure and find it harder to trust themselves, a fact that is reinforced by their lower recognition as compared to men [13]. Even in the best case, they have to work harder to gain the same recognition as their male counterparts. At this point, which involves subjectivity and qualitative analysis, it is important to investigate how women experience their careers in the three departments analyzed. This is a current focus of study, and our hypothesis is that experience interacts with the field of knowledge in question, which includes the values most strongly associated with it.

In summary, we believe this is an innovative study that demonstrates the complex situation of women. It is essential to analyze the specificity of the disciplines and their relationship with structural and symbolic obstacles, as well as their relationship with horizontal and vertical segregation phenomena. It is important to emphasize that the solution is not just the inclusion of women in pSTEM; this is necessary, but not sufficient. Firstly, for this to happen, we must stop gendering the values associated with such disciplines. But we have also mentioned that, at the same time, it requires significant awareness work to stop precarizing communal tasks associated with the feminine. Secondly, it is also important to recognize that more women in particular disciplines does not necessarily mean 'greater equity,' as demonstrated in IE and IB. At this point, it will be necessary to analyze how women are faring when they are present.

This point leads us back to the idea that the problem is not just the underrepresentation of women, and so the solution is not their mere inclusion. Instead, and taking up the simultaneity of new materialisms as the basis for our analysis [17], we consider it crucial to mention the overrepresentation of men and their absence in precarized spaces, both physical and symbolic. In our view, effective inclusion policies should simultaneously address structural and symbolic obstacles. That is, the goals of such policies should revalorize communal tasks associated with the feminine and promote the inclusion of men in these tasks. To achieve this, we must stop promoting gender stereotypes that feminize these tasks and masculinize certain roles through certain values such as abstraction and reason.

Furthermore, something suggested by this study is that gender equality is not achieved by eliminating horizontal segregation, as its reduction appears to increase vertical segregation in spaces where the associated values are less masculinized. In this sense, the fundamental goal of inclusion policies should be to 'de-gender' the values associated with the various disciplines, while not making them exclusive. For example, we know that emotion is a necessary epistemic filter for producing knowledge; however, this value is associated with the feminine and is considered an 'obstacle' to doing science. De-gendering, we emphasize, involves ceasing to promote stereotypes and, at the same time, not devaluing certain (feminized) occupations while overvaluing others (masculinized). We believe that this task

is the responsibility of everyone, because if we consider that caregiving and primary education tasks are mostly done by women, we must recognize that they have a role in perpetuating and reproduce gender stereotypes, and their associated values. In this sense, in line with our anti-essentialist stance, simply being a woman does not guarantee an end to legitimizing the precarization of the feminized and the feminization of the precarized.

Finally, in this study, we advocate for the contextualization and specificity of each discipline. In our university, precarization refers not only to appointments and incentives but also to the distinction between academic technical staff and researchers. A specific policy to de-precarize the academic technical staff category is to revalorize it in economic, physical, and symbolic terms. We also show that each institute has its particularities, which result from various factors, including the field of knowledge and the type of university. In this regard, stereotypes, and forms of precarization also become particular. This means that although we admit comparisons between the Institutes of Biology and Ecology, each has characteristic features that deserve qualitative evaluation, and these particularities should be considered in inclusion policies.

Conclusions

In this research, we have shown that the phenomenon of horizontal segregation, which is not observed in the Institutes of Biology and Ecology, results in an exacerbation of vertical segregation. In other words, the percentage of women in Titular C and Emeritus positions, and who enjoy the highest incentives - Pride C, SNI III, and SNI Emeritus - is lower in relation to the percentage of men. In the case of the Institute of Mathematics, where horizontal segregation is evident, we observe a dilution of vertical segregation. In other words, the percentage of women in Titular C and with higher incentives - Pride C, SNI III, and SNI Emeritus - is similar in almost all cases to the percentage of men, even in SNI Emeritus, there are more women. However, vertical segregation ‘does not disappear,’ as reflected in the absence of women Emeritus academic position, and fewer women in SNI III.

Therefore, we propose that horizontal segregation is directly related to the symbolic obstacles that women face and is inversely proportional to the phenomenon of vertical segregation. In contrast, vertical segregation is linked to structural obstacles and implies a reduction of horizontal segregation.

The precarization of women does not occur only in essentially feminized activities, such as communal tasks that include care and primary education. In the academic sphere, associated with the production of knowledge, and therefore fundamentally masculinized values, women experience structural and symbolic precarization. The balance between both factors depends on the discipline in which they operate. That is, how loaded with masculinized values a discipline is relates to the forms of precarization that women experience, either through exclusion from the field of knowledge—horizontal

segregation—or through restrictions on their academic-professional growth—vertical segregation—or through a combination of both.

In this study, we have shown that the knowledge areas that currently represent the highest cultural capital pose symbolic obstacles for women. Conversely, those areas that less strongly embody values associated with masculinity, and therefore have less cultural capital, present mainly structural obstacles for women. However, we have seen that both types of obstacles, far from being mutually exclusive, coexist to legitimize a structuring of social life where what is associated with the feminine is valued less, and where what is associated with the masculine, as the production of knowledge, when occupied by women, results in horizontal and vertical segregation phenomena that perpetuate the precarization of women.

We believe that these phenomena in the academic sphere are directly linked to communal occupations. In other words, in these spaces, horizontal segregation 'prevents' men through symbolic privileges that result in them not identifying with tasks that involve feminized values, such as empathy, sensitivity, etc., and, for the same reason, precarious occupations. It is necessary to examine how vertical segregation phenomena may manifest in these types of spaces, perhaps as we observe in less masculinized disciplines, the higher positions and authority continue to be held by men. In other words, a fundamental question is to investigate whether in spaces where there is an overrepresentation of women, the higher positions are mostly occupied by men or, on the contrary, if the devaluation of certain knowledge is such that high hierarchy positions do not imply epistemic authority, and therefore men are absent even in senior positions.

It is noteworthy that communal tasks, mostly carried out by women, involve knowledge associated with the education of children. This is not a minor detail because it is in educational spaces where gender stereotypes are perpetuated, associating certain values and, therefore, occupations with masculinity [19]. This leads us to avoid essentializing identities. In other words, it is important to investigate how women perpetuate these stereotypes, which distance them from disciplines such as pSTEM and simultaneously naturalize them in precarized-feminized spaces, leading to their precarization in the academic sphere.

In summary, we believe that precarization-feminization involves the production of spaces that, both symbolically and structurally, continue to legitimize gender inequality, resulting in privileges for men, through the phenomena of horizontal and vertical segregation. These spaces can be seen as a continuum, with communal tasks at one end representing the most precarious and feminized aspects. At the other end is the academic sphere, where precarization-feminization occurs based on the types of knowledge generated, perpetuating the gender pay gap.

Therefore, problematizing this continuum requires us to investigate how its extremes interact, how each point is interwoven with the others. In other words, we do not see a possibility of ending the precarization-feminization of women in STEM, i.e., in pSTEM and in disciplines like Biology and Ecology, without simultaneously questioning the precarization-feminization of communal occupations, both in their symbolic and structural aspects. The value system that generates knowledge and ranks it, resulting in male-associated knowledge having the highest cultural capital, leads us to think about strategies of simultaneity to eliminate gender inequality. Specifically, as we begin to de-gender values, we should also stop overvaluing certain occupations and undervaluing others. In this regard, the digitization of society requires well-educated 'adult' individuals: no one can become an adult without the care needed in early childhood, just as no one can access higher education without first passing through primary education. So, why is being an engineer valued more than caregiving tasks? In what sense is knowledge in mathematics more important than pedagogical knowledge for imparting knowledge to young children?

The value scale that permeates the production of knowledge is androcentric. The simultaneity of precarization and feminization is part of this value scale. Therefore, denature the precarization and feminization of specific occupations and women's status within certain spaces involves calling these values into question. A first step is not only to stop associating notions of objectivity, neutrality, abstraction, and reason with masculinity; it also involves questioning why these would be the only necessary values: are there not emotions that intersect with knowledge in pSTEM? And, finally, it is necessary a problematization that does not forget that there are empirical gaps in the scientific discourse about the sexual difference [19] that legitimizes natural differences in the processing of emotions between men and women, as well as in the capacity of abstraction and systematization.

Methods

Data collection

A systematic search of data related to academic personnel in three scientific research institutes was conducted. The tree analyzed STEM institutions included: Institute of Mathematics (pSTEM), Institute of Biology and Institute of Ecology, institutions belonging to the National Autonomous University of Mexico (UNAM), characterized by a contrasting gender distribution within the academic personnel: higher numbers of masculine personnel in Mathematics, in relation to Ecology, and Biology. The academic personnel at the UNAM research institutes are grouped into two categories: technical personnel and research personnel. In this paper, we mainly addressed the data corresponding to the research personnel, but we also mention some characteristics of the technical academic personnel.

A database was constructed based on the following variables: name, gender, age, academic degree, current academic position, academic position history (previous appointments since

the incorporation to the institution), current position corresponding to two types of incentives programs, the Academic Personnel Performance Incentive Program (PRIDE, UNAM's internal program) and the National System of Researchers (SNI, a broad national program), incentives programs history (previous positions in PRIDE and SNI). The gender variable, being protected data, was inferred based on the names of the individuals.

The data collection was performed using different strategies, including: exporting data from public repositories[21], direct requests via the General Transparency Program of the Mexican Government [22], and direct mail petitions to the administration of the analyzed institutes and to General Direction of Academic Personnel (DGAPA) office . In addition, remuneration data were collected using public repository portals reporting the most recent update (2022 or 2023) related to academic positions [23], and for the incentives programs PRIDE [24] and SNI [25].

Analysis

A basic descriptive analysis of data was computed by gender (inferred according to the name), as following: distribution graphs (proportional contribution and age) were obtained considering current data (July 2023) for academic position, and position for incentive programs (PRIDE and SNI) within each institute. To estimate average time for obtaining an Academic and Incentive Programs (A&IP) promotion, the following was considered: for academic positions, the year and level of the initial hiring category (position in which they began their professional career); for incentive programs, the year and initial level obtained (the first level registered in the database). Then, the time lapse between one promotion and the next was calculated. Finally, regarding the data related to remuneration, amount corresponding to research positions, as well as the amount corresponding to incentive programs positions (PRIDE and SNI) for academic personnel were calculated as percentage with respect to highest A&IP position. The analyses and graphs were done in Excel and with R language version 4.3.

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Figures:

FIG. 1

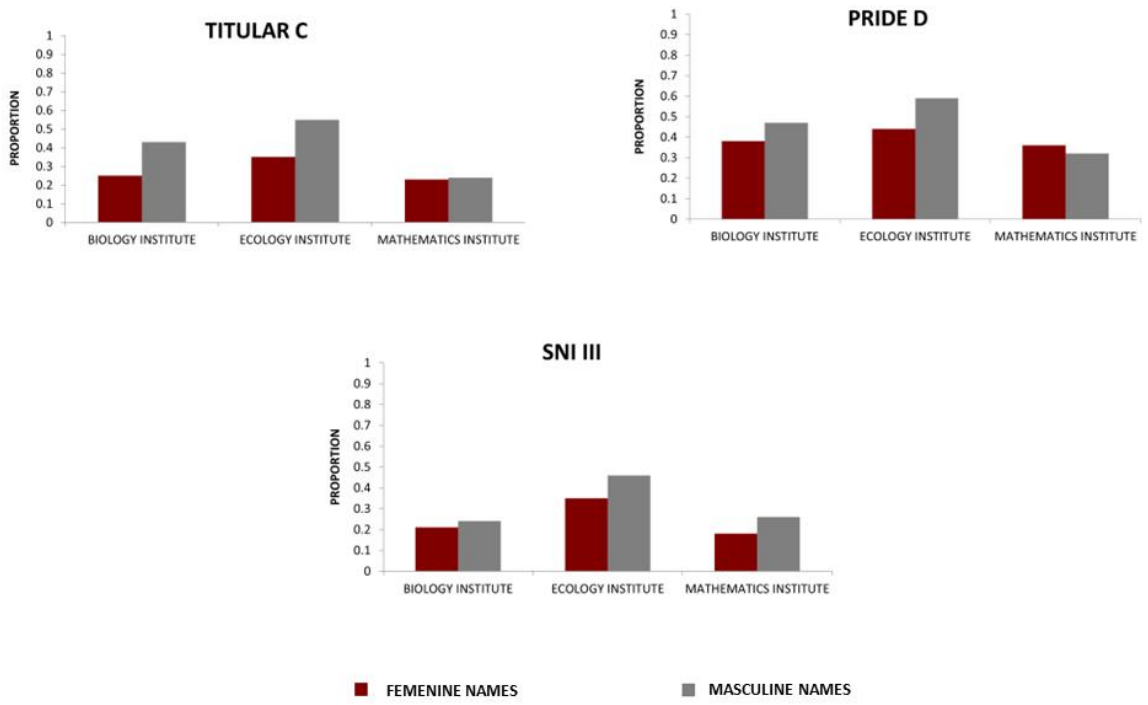


Figure 1. Proportional contribution comparation for the highest levels A&IP positions (feminine vs masculine academic personnel) in the three UNAM institutes, Biology, Ecology and Mathematics (whole data in Suppl. Fig. 2).

FIG. 2

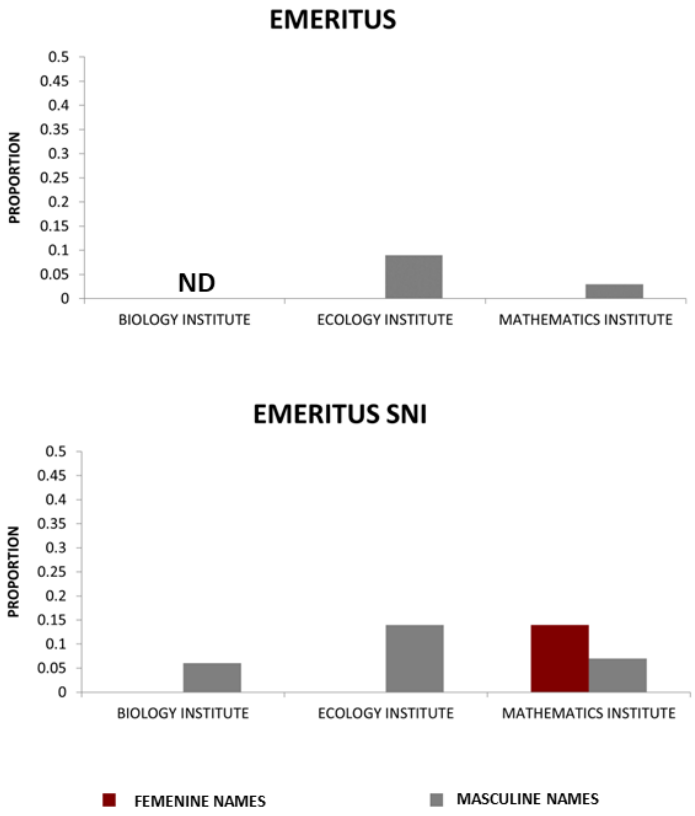
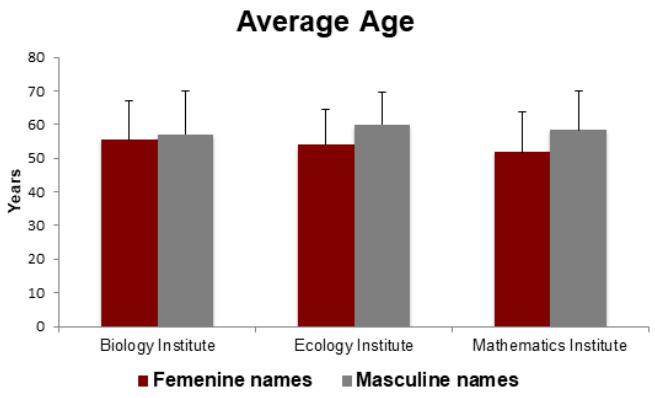


Figure 2. Proportional contribution of feminine and masculine academic personnel occupying Emeritus distinction (both academic position and SNI incentive) within the three institutes (whole data in Suppl. Fig. 2).

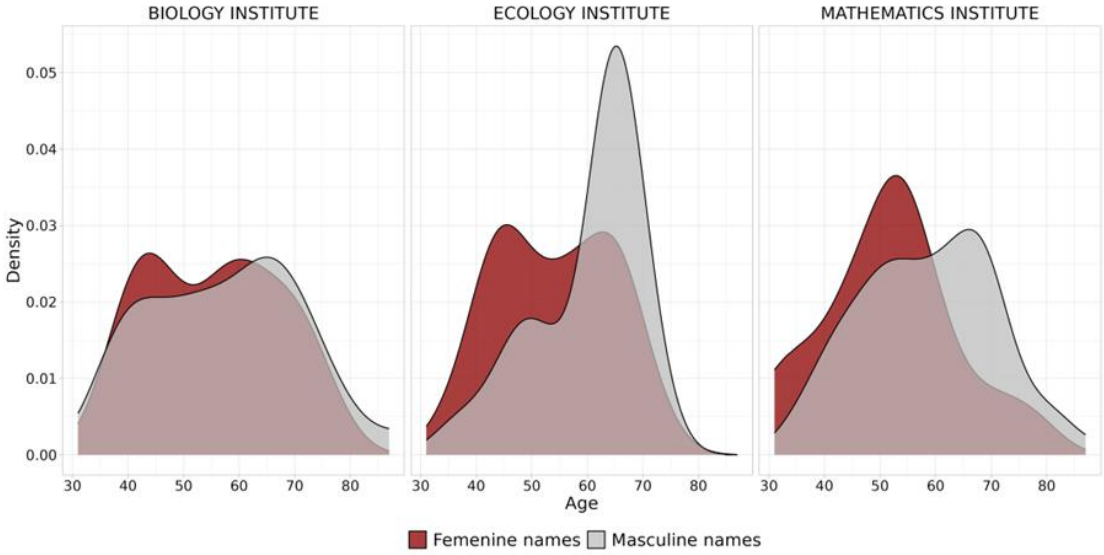
Supplementary :

SUPPL. FIG. 1

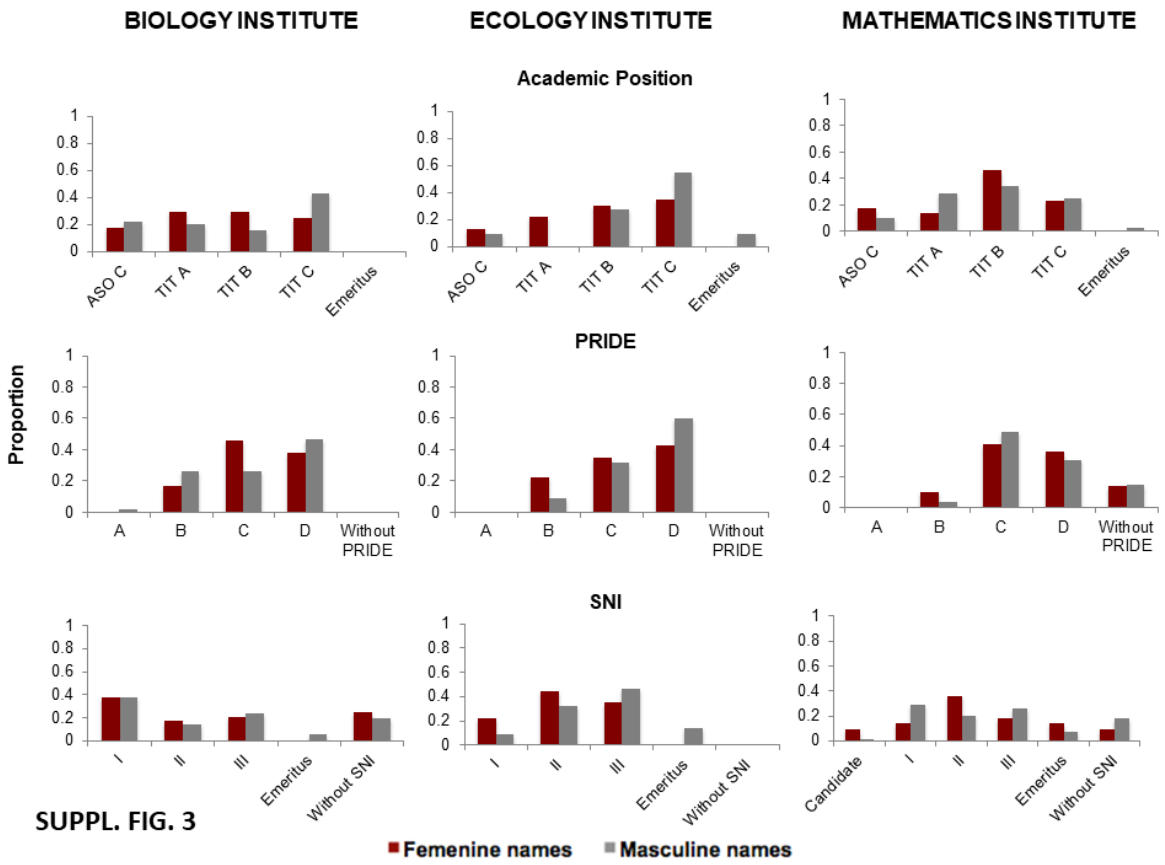


Suppl Fig. 1. Age average and standard deviation of feminine and masculine academic personnel in the three institutes.

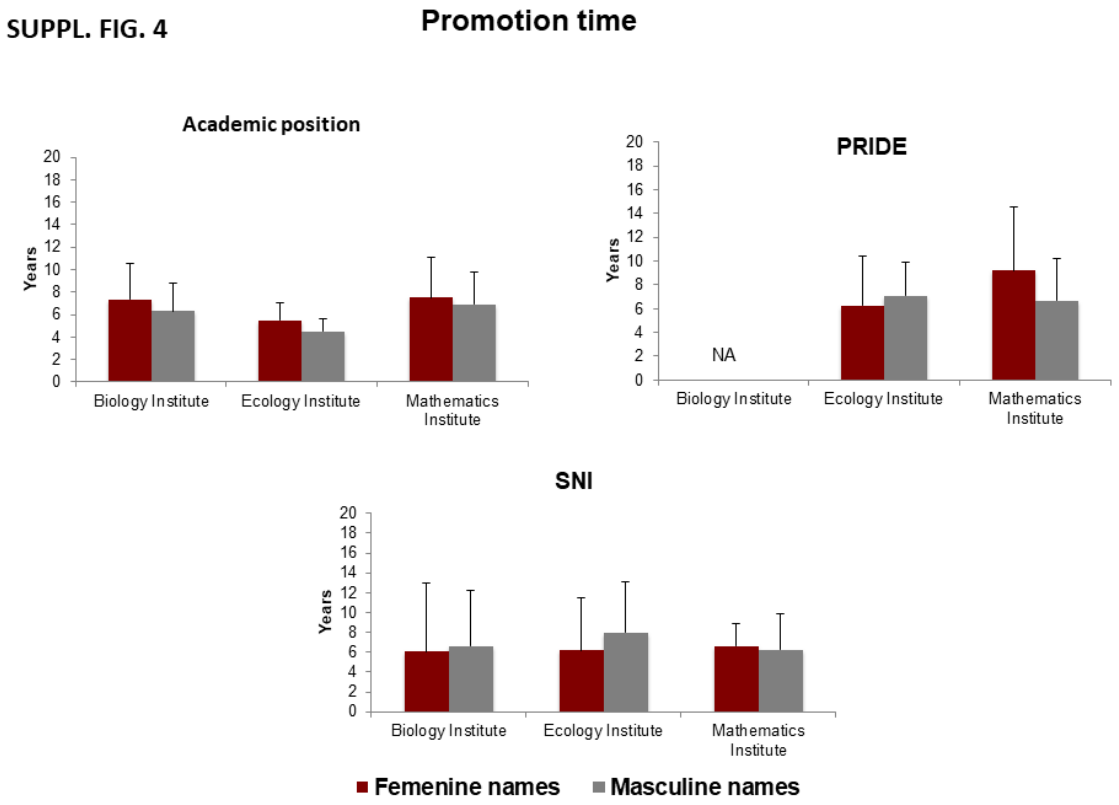
SUPPL. FIG. 2



Suppl. Fig. 2. Age normal distribution by gender and Institutes.

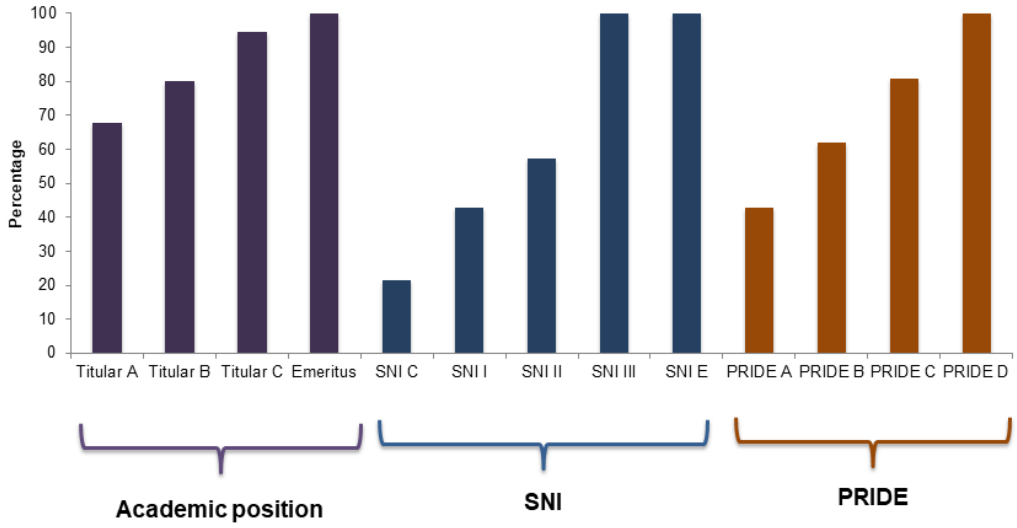


Suppl. Fig. 3. Proportional contribution of feminine and masculine research personnel from Biology (A, D and G), Ecology (B, E and H) an Mathematics (C, F and I) Institutes within academic positions and incentive programs positions



Suppl. Fig. 4. Average time and standard deviation for promotion (years) in feminine and masculine research personnel for academic (A) and incentive programs (B & C) positions within the 3 institutes analyzed (PRIDE IB data were not available).

SUPPL. FIG. 5



Suppl. Fig. 5. Remuneration differences, shown in percentage respect to the higher level within academic (research personnel data) and incentive programs positions (applies to all academic personnel).

Tables:

Suppl. Table 1. Feminine and masculine academic personnel counts within the three institutes (IB, Institute of Biology; IE, Institute of Ecology; IM, Institute of Mathematics)

ACADEMIC PERSONNEL COUNTS						
	IB		IE		IM	
	F	M	F	M	F	M
TECHNICAL PERSONNEL	47	39	21	14	6	15
RESEARCH PERSONNEL	24	51	23	22	22	73
TOTAL	71	90	44	36	28	88

Suppl. Table 2. Remuneration (mexican pesos) by positions for the academic personnel of UNAM´s institutes corresponding to 2023 year[23], ordered from lower to higher levels. NA = Not Applicable (Emerit is a distinction that does not exist for technical personnel). For comparative purposes, we show only the three highest levels for technical personnel (those equivalents to research personnel levels).*

POSITION	TECHNICAL PERSONNEL	RESEARCH PERSONNEL
TITULAR A	19,451.36	25,254.4
TITULAR B	21,882.76	29,851.24
TITULAR C	25,254.4	35,287
EMERIT	NA	37,265.66

*Academic technical staff are responsible for both academic and technical tasks within the university, and there is an implicit devaluation of such roles. The association of 'technical' work with productive labour translates into the perception that 'technical' activities are of lower status, while academic activities are linked to greater prestige [26]. This devaluation is, of course, associated with economic precarity and can be observed when comparing the perceptions of academic technical staff with those of research staff.