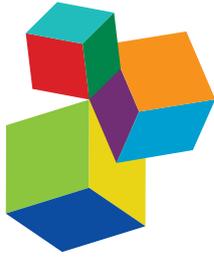


GENDER EQUALITY AND WOMEN'S EMPOWERMENT IN EDUCATION

EDITED BY: Delfín Ortega-Sánchez, Esther Sanz De La Cal,
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GENDER EQUALITY AND WOMEN'S EMPOWERMENT IN EDUCATION

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Editorial: Gender Equality and Women's Empowerment in Education

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Keywords: gender equality, teacher training, gender representation, gender stereotypes, higher education, primary and secondary education, early childhood education

Editorial on the Research Topic

Gender Equality and Women's Empowerment in Education

Current scholarly literature shows that gender inequalities are still present in the process of curricular decision making and teacher practices. These inequalities are expressed through the selection of educational content, the application of methodological strategies, the selection of teaching resources, interpersonal relationships, specific task assignments, or even seating choices within the classroom. These ongoing gender-related issues drive the need for teachers to receive specific and transversal training in this area. Such trainings should be aimed at revealing gender relations as a type of power relationship for the promotion of social change.

The literature in the field of teacher training indicates that the maintenance of gender stereotypes and biases in teacher discourses and practices reinforces the sex-gender system and, consequently, inequalities. Further research is therefore still needed to study the discourses that emerged from the teaching practices around gender. Moreover, research in this field should encourage critical reflection on teacher training plans and the teaching curriculum itself.

The adoption of coeducational approaches and the promotion of education in and for gender equality entails transforming the traditional teaching curriculum to overcome the androcentric constructive bases of historical, social, and literary knowledge. Such transformation would also motivate the incorporation of “polysemic views” in the understanding and interpretation of social reality. Even today, it is common to recognize in mainstream social communication discourses, such as advertising or audio-visual artistic expressions, clear imagery of unquestionable, allegedly identarian gender cultural patterns. The overcoming or relativization of these patterns should necessarily go through the reexamination of curricular content.

The eradication of gender inequalities requires not only the integration of all the voices that have built social knowledge but also the overcoming of gender stereotypes within the education system. It is thus essential to identify the shortcomings of teachers' training and encourage gender studies as a requisite for their curricula in order to achieve inclusive, plural, and diverse models for teaching practices.

This Research Topic includes 15 manuscripts, from nine prestigious international academic institutions (Austria, Brazil, Canada, Chile, China, Finland, Germany, Spain, and Sweden) on important topics related to the inclusion of gender inequalities in teacher training, and the analysis of this concept in the official school curriculum, materials, and teacher practices.

The experiences and socio-cultural constructions of the concept of gender constitute the explanatory core of the research problem addressed in “*The Challenge of Women's Inclusion for*

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Novel Teachers. Case Study in a Teacher Educator Public University". This research analyzes the representations of novice teachers of History and Social Sciences on the presence and absence of women's historical experience in their teaching practices. The research demonstrates the permanence of positivist and androcentric epistemological approaches in the teaching of History, and highlights the urgency of addressing gender inequalities as one of the most pressing social problems of our contemporaneity. In this vein, "Classical Sociology Through the Lens of Gendered Experiences" seeks to promote discussion on the mediating role of gendered experiences in classical sociology's theories of the move towards modern society. This study evidences the constructive relativity of social knowledge and its consequences for sociological teaching and learning.

From the conception of a socio-constructive nature of sexism, the research "Intersections Around Ambivalent Sexism: Internalized Homonegativity, Resistance to Heteronormativity and Other Correlates" explores the levels of internalized sexism and homonegativity, and the resistance to heteronormativity of Spanish psychology students. Its results are consistent with those obtained in the study "Evaluation of Sexist and Prejudiced Attitudes Toward Homosexuality in Spanish Future Teachers: Analysis of Related Variables", focused on the analysis of sexist and prejudiced attitudes toward homosexuality of future Spanish teachers. Both studies show the influence of factors such as political ideology, gender identity and sexual orientation on students' beliefs and perceptions. They also point out the need to advance in the eradication of discrimination based on sex and sexual diversity in the training of future professionals, and the implementation of intersectional approaches to understand the sexist construct.

The consequences of the invisibility of female referents in education and, therefore, of models on which to build plural and empowered identities, derives from the limitations inherent in traditional gender expectations and attributions. The educational hegemony of these attributions, the basis of the study "Nine Contradictory Observations About Girls' and Boys' Upbringing and Education—The Strength-Based Approach as the Way to Eliminate the Gender Gap", continue to limit the potential expectations and talents of girls. Through "nine contradictory observations", this article directs its proposal towards a "strength-based approach" as a way to eradicate the gender gap. Along these lines, "Mindfulness and Empathy: Mediating Factors and Gender Differences in a Spanish Sample" highlights the lack of studies aimed at analyzing the potential moderating role of gender in the development of empathic skills.

The research production around the gender gap and gender-segregated differentiation seems not to have received the desired impact in educational social spaces. From this perspective, on the one hand, the article "Differentiations in Visibility-Male Advantages and Female Disadvantages in Gender-Segregated Programmes" starts from the differential articulation of inter- and intra-group visibility, by gender, in students, underrepresented in their programmes. On the other hand, the works "Distributing Feedback Wisely to Empower Girls in STEM" and "Girls in STEM: Is It a Female Role-Model Thing?" highlight the still distant presence of women in the development of

STEM professions, a circumstance originating in the educational context and influenced, therefore, by traditional gender models and by social factors that have an impact on the construction of personal identities, as also evidenced by the work "What Dominates the Female Class Identification? Evidence From China".

These constructed identities are revealed in the underestimation of the self-efficacy of secondary school students regarding their competences in STEM subjects, as shown in the work "Parent and Teacher Depictions of Gender Gaps in Secondary Student Appraisals of Their Academic Competences". Consequently, the analysis of self-efficacy, expectations of results, interest in STEM areas and the intervention in the classrooms of plural female role models are proposed as necessary working spaces to redirect this trend. These results are completed with the analysis of the potential influence of gender stereotypes in biased student evaluations of teaching in "Gender Stereotypes in Student Evaluations of Teaching".

From the area of Brazilian physical education, "Gender Participation and Preference: A Multiple-Case Study on Teaching Circus at PE in Brazilians Schools" reports on the elective influence of Primary Education teachers in the assignment of circus physical activities according to gender, extensible to the sports activities of traditional teaching. In order to advance in critical and emancipatory training proposals in gender equality in this area, "Breaking Cultural Taboos' About the Body and Gender: Brazilian Students' Emancipation From a Thematic Perspective of School Physical Education" stresses the importance of teaching programs oriented to the cultural construction of the differential concept of the body. From this perspective, the work "REFLECT—A Teacher Training Program to Promote Gender Equality in Schools" emphasizes the hegemonic role of socializing agents in maintaining the *status quo* of gender stereotypes in education and in the future professional development of men and women. As a response to the permanence of the sex-gender system, and to the evidence of the influence of teachers' attitudes and practices in the promotion of truly coeducational educational environments, this program, aimed at future teachers of Secondary Education, aims to contribute, in a sustainable way, to gender equality from the educational spaces of subjective action (such as self-efficacy), and objective action (teaching methods and knowledge).

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All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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The Challenge of Women's Inclusion for Novel Teachers. Case Study in a Teacher Educator Public University

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The following article is about the conceptions that different novel teachers of history and social sciences have concerning the inclusion of women and their history during their teaching practices. The objectives followed were to interpret and understand the content of the discourse of the interviewees, in order to analyse the advantages and limitations that the participants recount about their initial teaching practices. The methodology used is qualitative, forming a focus group and interviewing the teachers. Amongst the main results, it stands out that the formation given has not included women and their history, confined in traditional perspectives with predominance of powerful men. The interviewees add that in their teaching practice they have not worked with women's narrative, however; they recognize how relevant it is to include and transform teaching practices based on the recognition of gender issues in today's world. From a history and social sciences teaching point of view, learning, and working with the relevance of actions and narratives of women would generate agency. Thus, students could feel empower themselves by identifying themselves with these new models; this with the objective of generating social change concerning gender equality.

Keywords: gender education, teacher education, citizenship education, women history, social thinking

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INTRODUCTION

Critical theory and their approaches were considered for the analysis and reflection over the content of the speech of the participants (Giroux, 1998; Apple and Beane, 2012; Apple, 2014; McLaren and Kincheloe, 2015). Critical theory provides tools to reflect on teaching and learning processes with the purpose of generating developments concerning the fight against inequality because of gender, ethnic groups and social status. As Giroux (1998) and McLaren and Kincheloe (2015) stated, one of the objectives of critical perspectives is to position social justice as an axis of educational projects. It must be acknowledged that the struggle is against a school that has silenced, traditionally and historically, the different critical expressions of their students (Giroux, 1998; Apple, 2014). The authors state that their stories, knowledge and possibilities of generating changes are scarcely worked on Giroux (1998), unlike the broad work done in the interests of powerful structures.

We coincide with the idea that the school is, within the analysis of critical theory, a space of hegemonic struggle over the domain and transmission of specific and dominant ideologies (Apple, 1998, 2014). These ideologies usually belong to those who have or have had power. The educational guidelines can vary according to the current government, however; what rarely varies is the hegemonic and ideological struggle. The school deals with the *distribution of standards and convenient dispositions that each of us will assume in a hierarchic society* (Apple, 1998, p. 33).

Bonilla and Martínez (1992), Apple and Beane (2012), and Azorín (2015) agree with what has been posited adding that the school and their teaching systems fragments knowledge aligning it with the “official” instructions of content and standardized tests. In general, this content does not recognize the presence and actions of characters that are outside the dominant culture, such as women, ethnic groups, immigrants, childhood, amongst other absentees. The rare times these characters are depicted, they are relegated to their condition of secondary characters in spite of their own individualities, always subordinated to the actions of the powerful male protagonist (Marolla, 2019a,b).

Regarding the context where this study is developed, it is important to consider that there are both public and private universities in the Chilean educational system. In both systems a tuition fee must be paid and the amount will depend on the type of institution. As to the school system (ages six to eighteen) there are three types of schools: state, private, and mixed. The employment system for novel teachers does not show greater complexity. This is because, there are neither applications nor public tenders to fill in the positions. Therefore, each year the school’s administration selects curricula to integrate the novel teachers into the teaching staff. This selection is made under different selection criteria, such as external recommendations, qualifications, and/or school necessities. The selection criteria are of exclusive decision of each school’s administration department. Thus the lack of problems novel teachers face to be integrated into the school system, furthermore; this enables yearly mobility and integration of novel and experimented teachers in educational establishments (Marolla, 2019b).

It is relevant to state that the study programmes and the official curriculum supplied by the Chilean Education Ministry, which belongs to the State, and specifically, the history, and social science programmes are built based on traditional perspectives on history with male, white, and western protagonists. As a consequence, the formation of the teaching staff in general is framed as to provide future history and social sciences teachers the necessary tools and strategies to continue teaching based on the traditional perspectives: the protagonism of men that have had political, social and economic power (Apple, 1998).

THEORETICAL FRAMEWORK

When teaching history and social sciences is done from ideologies that arise from pre-established power hierarchies it causes the preservation of *status quo*, which has been in charge of the production and reproduction of the aforementioned power hierarchies and, this way, of the continuance of social inequality (Azorín, 2015; Balteiro and Roig-Marín, 2015; McLaren and Kincheloe, 2015). History is presented as a tale or narrative built from the protagonists that have had some sort of political, economic, and/or military power in society (Barton, 2002), perpetuating the absence of women, who are understood as passive historic characters without any relevance to the social progress.

It can be acknowledged that in the last decades legislation, as well as the studies and movements concerning women,

gender and feminism have incremented (Hutchinson, 1992, 2001; Badinter, 1993; Bengoa, 1996; Lerda and Todaro, 1997; Scott, 2008; Friedan, 2009; Díez Bedmar, 2015; Díaz de Greñu and Anguita, 2017). Regardless, this does not mean that there is social justice for marginalized, poor, dissident, anti-capitalistic and migrant women that continue suffering violence, rape, abuse and marginalization, amongst other atrocities.

It is priority that the fight for empowerment and gender social justice spreads to every area of social and cultural life. From the didactics of social sciences point of view, we face the challenge of the formation of new generations; antisexist, and anticapitalistic formation recognizing the fights that have occurred throughout the history of the movement for gender social justice (Hooks, 2000). However, currently women and childhood are not protagonists of the history that is taught and learnt (Marolla, 2019a,b). On the contrary, their voices and narratives are absent while their tales and actions continue to be subordinated by the history of powerful men. Thus, women continue to be mere spectators of the history that is being taught (Spivak, 2012).

Díez Bedmar (2015), Tomé and Rambla (2001), and Díaz de Greñu and Anguita (2017) agree that women, their voices and history are absent in the educational processes as well as in books, programmes and teaching practices (Pinochet, 2015; Marolla, 2019a,b). In fact, Appleby et al. (1994) agree that history and its teaching has been built and transmitted from the hegemonic national values, hierarchic masculinity, and the exclusion of a diverse and pluralist society. To female authors the history that is taught stands out for being racist, sexist, and homophobic (Díez Bedmar, 2015).

Alonso Gutiérrez (1998), Vavrus (2009), Stanley (2010), and Crocco (2018) agree that the teaching staff is an agent in the transmission of gender stereotypes. If the formation continues under the traditional structures of history teaching, issues such as discrimination and inequality will continue to be produced and reproduced in classrooms as well as in society (Ortega-Sánchez and Pagès, 2018; Marolla, 2019a).

Moreno and Sastre (2003), Díez Bedmar (2015), and Crocco (2018) claim that teaching staffs, due to their formation and the androcentric social structures, tend to teach from the patriarchal hegemonic model. Thus a radical change of approaches must exist concerning formation and practices. It is not enough to include women but it is necessary to rethink the models that are included (Espigado, 2004; Fernández and Johnson, 2015; Marolla, 2019a,b). Teaching must encourage reflection and analysis of the provided spaces and tales on women and their history. Accordingly, stereotypes, biases, as well as traditional and normalized marginalization begin to breakdown.

When women are included it is from anecdotal positions or highlighting only those women who, somehow, have had a connection with powerful men. Most women, who have identified themselves with the plight of their people and the dissidences, do not have the place to express their voices, actions, and problems. Women, poor people, children, girls, elderly men, and women, and those who belong to non-white ethnic groups are the human groups that have suffered and continue

to be oppressed and dominated (Pagès and Sant, 2012; Ortega-Sánchez and Pagès, 2018; Marolla, 2019a,b); like so, the school acts as a collaborator producing and reproducing guidelines as well as cultural and gender stereotypes. Bullock and Stallybrass (1977) state that sexism is manifested as *a system rooted in beliefs, attitudes and institutions, often unconsciously, in which the distinctions between intrinsic value of people are based on their gender and sexual roles* (Bullock and Stallybrass, 1977; Gillborn, 1990, p. 165).

Subirats and Brullet (1988), Aubert et al. (2010), Díez Bedmar (2015), and Díaz de Greñu and Anguita (2017) claim that, because of what has been stated before, there are barely any women in historical narratives. Practically, there are not any female philosophers, scientists, workers, and leaders except those who have become prominent because of their collaboration in masculine protagonism. Feminine subordination has been naturalized in society (Marolla, 2019a).

Harris (1996), Bickmore (1999, 2002, 2008), Vega (2002), and Aguilar Ródenas (2015) agree that the school is an excellent place to promote and generate changes. The process of teaching and learning could arise from the students' critic and reflection regarding social inequalities and injustices from a gender perspective.

Crocco (2008, 2018) states, agreeing with what has been discussed, that the inclusion of women in teaching and learning history not only requires that it is done in the curriculum, programmes, and books, but it is required that the practices and discourses that are transmitted are critical and reflexive, inclusive and diverse. There must be a teaching practice and a discourse that not only includes women and their voices, but it must also promote the critic of their structures and spaces where gender inequality remains and reproduces (García Luque, 2013; Rodríguez Martínez, 2014).

Álvarez de Zayas and Palomo Alemán (2002) and Azorín (2015) agree that inclusion of diversity favors new understanding of the processes, and specially, of the social reality the students are part of. It is a way, according to the authors, that the students can identify with historical references. Grever (1991), Volman et al. (1993), Díez Bedmar (2015), Fernández Valencia (2015), and Díaz de Greñu and Anguita (2017) and add that from identification they could start to consider spaces and paths to social activity and politics against inequality and gender violence.

Therefore, Casas (1999), Subirats (2001), and Azorín (2015) posit that, first of all, school spaces must be democratized with the purpose of breaking the gender barriers that can be found in the classrooms and in teaching. Concerning this, Thornton (2010) states that women, as well as other actors and actresses who are prominent in society but have been made invisible in history teaching, are essential to make transformations. Hence the author asks this: *“Does everybody count as human?”* (Thornton, 2010, p. 88).

Woyshner (2002) claims that research concerning the teaching staff must not only be about women's experiences and voices, but about inclusion of topics that have been traditionally silenced as bodies, sex, race, private life, feminine mind-set, domestic work, among others. There are many female authors that have worked on this and have presented the urgent necessity that

the teaching staff becomes a critic of traditional and masculine history with the purpose to provide students with places that could generate participation and empowerment against gender inequality (Hahn, 1996; Asher and Crocco, 2001; Hess, 2002; Crocco and Libresco, 2007; Bickmore, 2008; Crocco, 2010, 2018; Donoso-Vázquez and Velasco-Martínez, 2013; Aguilar Ródenas, 2015; Balteiro and Roig-Marín, 2015; Díez Bedmar, 2015; Fernández and Johnson, 2015; Díaz de Greñu and Anguita, 2017; Ortega-Sánchez and Pagès, 2018).

METHODS

Design

The study is of qualitative type (Álvarez-Gayou, 2003) following the strategy of collective case study (Simons, 2011). In addition, critical methodology was used for the analysis conceptions (Álvarez-Gayou, 2003; Cohen et al., 2007). Arnal et al. (1994) posit that such strategy delivers the chance to make decisions, generate assumptions and reflect to the emancipation of people.

The advantages of case studies, following Arnal et al. (1994), Cohen et al. (2007), Stake (2007), and Simons (2011) are: (a) to discover facts or processes that other methodologies would overlook; (b) to deliver chances to uncover deep and unknown meanings; (c) to collaborate in the comprehension of complex and educative realities; (d) to involve the participants and the researcher in the comprehension of educational practices; (e) to include an specific population and does not pretend to generalize the findings of the research.

The design of the study is designed through the ideas of Habermas (1988) and Wolcott (1994), as described by Smyth (1989). Wolcott (1994) presents three stages: description, analysis and interpretation. The description stage is focused on what is happens; the analysis stage determines how structures and relationships work. While, the interpretation phase is concerned with the results obtained with the purpose of understanding the processes. Smyth (1989) based on the critical thoughts of Habermas (1988) proposes a sequence of four stages: description (what is happening?), information (what does it mean?), confrontation (why does it happen?), and reconstruction (how could it be different?), this model was used by Marolla (2019a,b).

It is noteworthy that what has been included in this study about novel teachers as well as the objectives and proposed methodology are part of a much wider research that includes different types of teachers such as historians and teachers of teachers; data which is still in the analysis stage. Nevertheless, due to the relevance of the data gathered from the novel teachers; it was decided to give the same relevancy to these in relation to the results of this study.

Objectives

The objectives of the investigation were:

- To describe and analyse the content of the novel teachers' discourse concerning the inclusion of women in initial teaching practices in history and social sciences teaching.

- To explore the opportunities and the limitations that the participants have pointed out concerning the inclusion of women and their narratives in their initial teaching practice.
- To explore the opportunities and the alternatives limitations that the novel teachers have put forward pointed out in order to include women and their history in their teaching practice.
- To offer and describe ideas and perspectives concerning the spaces that the participants have proposed have pointed out, with the aim to include and present as an issue problematize the assigned role to women and their history in the teaching practices.

Participants

The participants were five female and male teachers of history and geography who had been teaching for a year in public schools in Santiago, Chile. All of them were awarded their degree and title in a public university that forms teachers. Every name included is fictitious, in order to give identity to every participant while safeguarding their anonymity and integrity at all times. The participant's age ranges between 25–27 years old, which makes them young teachers early in their career. In **Table 1**, essential characteristics of the participants are detailed:

The criteria used for selection was framed according to the definitions of Rodríguez Gómez et al. (1999) and Simons (2011): (a) the accessibility and easiness to remain at work in the field; (b) the existence of diverse processes and interactions; (c) the chance to establish a good rapport with the informants; (d) the geographic location and; (e) the disposition of the institutions and people that participated. It is worth stressing that the selection of participants was not done with representation in mind, but with the purpose of meeting the objectives set for the study.

We assume that the initial study presented is a big advancement for the didactic area of social sciences and the inclusion of female protagonists in the teaching and learning processes. Specially, for the issues of discrimination, stereotypes, and bias that firmly prevail in our classrooms, as well as the constant productions and reproductions of the classic gender roles and patterns. What has been stated here could serve as an initial study since by no means this study has aimed for generalization. The results, this way, leave the open option that this research topic, methodology, and objectives are replicated based on a bigger sample, with the objective to corroborate the methodological approaches, as well as to provide new ideas and perspectives concerning the research questions (?).

The Interviews and Focus Groups

The interviews were semi-structured, following the criteria of Álvarez-Gayou (2003), Bisquerra (2004), Stake (2007), and Creswell (2014). The focus group was conducted after the interview was finished. This decision was advantageous because it facilitated the clarification of topics that arose in the interview, at the same time it allowed to contrast different expressions expressed by the teachers (Álvarez-Gayou, 2003; Bisquerra, 2004; Cohen et al., 2007). The design of the interviews and the focus group was constructed according to Álvarez-Gayou (2003) and Cohen et al. (2007) following: (a) number of participants; (b) selection, duration, guideline, and technical support, and; (c) informants that are willing to share their experiences.

In the interviews the method used was informal conversation interviews with the aim to generate trusting environment and relationship which allowed the informants to share their experiences and opinions with freedom. Cohen et al. (2007) add that this method is ideal to gather information about controversial topics since a non-hierarchic space is created so the participants can express their ideas freely. The inquiry, the data reduction analysis, the categorical measurement and the categorization for the research designs phases followed (Bisquerra, 2004; Cohen et al., 2007; Simons, 2011). These phases contributed with the construction and the execution of the interviews.

The reduction phase contributes with the information selection which is key concerning the answers gathered in the interviews (Bisquerra, 2004; Cohen et al., 2007). The categorical measurement contributes in establishing concepts and classifications based on key information that answers to the objectives, and the categorization phase helps to establish useful patterns to put the information in order, based on the objectives of the study (Bisquerra, 2004; Cohen et al., 2007; Simons, 2011).

The construction of the focus groups was done according to Álvarez-Gayou (2003) and Cohen et al. (2007) criteria where they suggest that their design is undertaken after the interviews with the aim of generating questions and topics based on what was firstly said by the interviewees. The strategy of “the probes” was used (Cohen et al., 2007), which consists of generating extensions to the themes and answers gathered in the interviews. In addition, with “the probes,” extensions and clarifications are generated concerning what has been said in the interview process as well as in the focus group itself. This way information could be compared, topics explored in depth, debate

TABLE 1 | Participants.

Name	Age	Studies	Socioeconomic level	Experience	Gender
Karla	25	History and social sciences teacher	Upper class	1 year	Woman
Maya	25	History and social sciences teacher	Middle class	1 year	Woman
Vale	26	History and social sciences teacher	Middle class	1 year	Woman
Diana	27	History and social sciences teacher	Upper class	1 year	Woman
Richard	27	History and social sciences teacher	Middle class	1 year	Man

Source: *Own elaboration.*

between the participants generated, and consensus amongst the questions established.

Data Analysis

The process that was followed for the qualitative analysis was based on the stages that arose by the claims of Miles and Huberman (1994), Wolcott (1994), Stake (2007), and Creswell (2014). The followed stages were: (a) descriptive stage; (b) analytic stage; (c) case interpretation stage (where data is put in order, patterns are organized, concepts, and schemes to reflect about the problem); (d) triangulation; (e) critical stage (where analysis and reflection about data are done). It is important to highlight that for the speech analysis delivered by the participants, Bardin's (1986) content analysis was used.

With the objective of defining the research results, the following research questions are posed which have served as a guide in the instruments' design and in the analysis of the teacher's discourse that the teacher staff has provided: How would you describe the initial teaching practices you have done? What are the main difficulties that you have faced teaching history and social sciences? Have you included women and their narrative in the teaching processes? How would you describe the topics that are seen in class? With which protagonists do you work in history and social sciences class? Which are the perspectives that you believe would promote the inclusion of women and their narratives in teaching practice? What is required in classrooms and in teaching to include women and their narrative in the teaching practice? How would you assess the first year of teaching practice concerning women and their history as protagonists in your classes? What are the main opportunities and the obstacles that you could describe that influence the teaching practices to include women and their history? All of these questions, are intertwined directly with the proposed objectives in the construction of the instruments and in the definition of the topics that are presented in the results.

Ethical Criteria

The ethical criteria were defined according to the democratic model for research (Simons, 2011). This model states that this type of research proposes the implication of the participants. Confidentiality, negotiation, and accessibility were used with the purpose to make knowledge available in a public way whilst caring that the research does not affect the participants. For this, an informed consent (Stake, 2007; Simons, 2011; Creswell, 2014) was given to the participants where they, understanding the study's objectives, expressed their willingness to participate. Furthermore, the participants were shown the transcripts and results, this with the objective of approving their use, or otherwise correcting/deleting the content.

Confidentiality and anonymity (Cohen et al., 2007; Stake, 2007; Simons, 2011; Creswell, 2014) allowed safeguarding the participants concerning any sensitive, personal, or problematic information. Pseudonyms were used for participants as well as the institutions involved. Therefore, people's integrity is under safekeeping and protection in this study. The ethical protocol was

approved by University of the Americas. All participants gave written informed consent in accordance with the Declaration of Helsinki.

RESULTS

Practicality of History and Social Sciences Teaching and Learning

The participants shared their impressions on the practicality of history and social sciences from a gender perspective. Vale claims that it gives a "sense of reality" (Vale, 2018), beyond the contrast of past and present, history provides tools for people to "think for themselves" (Vale, 2018). Diana agrees with what was said and adds that it collaborates in making students feel "part of a whole" (Diana, 2018), because these competences should be acquired in order to fight against "inequality and their own context" (Diana, 2018). Karla states that, at the same time, "history is supposed to drive oneself to reflect about the causes and consequences of one's own acts" (Karla, 2018).

Regardless, the participants mention some difficulties that prevent them to meet the objectives stated. For example, Karla said the pressure to "comply with the programmes based on the objectives of the State" (Karla, 2018) as well as standardized tests, makes it complicated to pose other objectives. Vale and Karla agree that teaching becomes a "mechanistic [sic] process that is not meaningful for the student" (Vale, 2018) because learning based on data memorization primes in class. This is explained by Maya, adding that "the school is focused in facts and events" (Maya, 2018).

Furthermore, Richard states that the curricular organization itself complicates the integration of new themes and characters "the students have problems seeing themselves in the past and see [history] as something disconnected from the present [...] particularly with world history content or content that is not closely related to students" (Richard, 2018). Vale agrees and adds that this is caused by the professional formation they have had, where she stresses they are taught "a very chauvinist history, much about men" (Vale, 2018).

All of the participants agree that in the moment they require assistance from their colleagues from the area of history and social sciences to include women and their history, as to generate innovation, but these could not be carried out because of the heavy workload and pressure that their peers were under to cover the contents included in the curriculum. In addition to this and most importantly they all coincide by expressing similar problems concerning the lack of didactic tools and strategies, as well as little knowledge of historiographic perspectives to include women and their history. Moreover, they detail the dominance of historic knowledge based only in the current official curriculum as, with the prevalence of male protagonists who have political, economic, and military power.

Diana, concerning the professional formation granted, claims "I had no courses about women"; thus, she comments that other female and male teachers formed "do not know anything, do not have any context and never go near feminism [...] they continue

to replicate history” (Diana, 2018). Vale adds that “the text books are decontextualized or not up to date” (Vale, 2018), thus the history and social science that we teach comes from a traditional and masculine point of view.

Vale states that teaching teachers is fundamental to suggest inclusion of women and their history; however, “in my mayor overall: Are there any women’s education courses? No” (Vale, 2018). Diana agrees with what was stated and adds that hers was a formation focused on the history of male protagonism, “I do not recall that even one of the questions, in tests, in the different history classes, focused on women” (Diana, 2018). Maya adds that, in her mayor, to suggest women’s inclusion and their history came from a personal initiative, since the mandatory subjects involved powerful men as protagonists. It was about developing inclusion “from a perspective of what was more appealing to me and develop it as a personal interest” (Maya, 2018).

Topics That Are Worked in Class

Diana states that, more than just content, she looks to work from the comprehension of the discourse that is transmitted in history and social sciences teaching. Nevertheless, in the framework of women’s inclusion, she expressed that “it lacks meaningfulness” (Diana, 2018). In fact, she adds by commenting that in one of her classes “we were discussing the Second World War and every name, every topic were only related to masculinity. The dates, the characters, everything is masculine” (Diana, 2018). According to the interviewee, the female students posit “What is it with us women that we have not been able to bring up this discourse?” (Diana, 2018).

In her experience, Diana reveals that in class, from masculinity we face “hostile and violent environment” (Diana, 2018), thusly Richard states that in order to “make a change the discourse and the way of how one refers to individuals and women” must change (Richard, 2018). To Richard, the complexity lies in that it is a matter of power “where men have the power, power quotas [...] because are seeing as powerful figures and women have not had power” (Richard, 2018). Vale agrees with what was stated and adds that “we as female teachers are ignorant concerning women’s history” (Maya, 2018) what supposes obstacles to suggest new content.

Maya and Vale agree with this and add that “somehow one builds a society with language and characters” (Vale, 2018), Maya comments that this is crucial because it is “a duty as a teacher to do so” (Maya, 2018) with the purpose to generate social transformations. Vale considers that women’s inclusion is conducted outside the official requirements and moved by personal initiatives “it is almost personal what the teaching staff does [...] I believe that there are empowered women, the issue is that the studies that are executed are not focused on this matter” (Vale, 2018). Hereby the approach is, from the teacher’s point of view, that sources are found within the teaching staff and these generate new inclusive practices.

In addition to this, the teacher claims that with the limitations that arise in the classroom changes to the structures could be made since in her opinion: “it is not necessary to change the curriculum; it is based on what it is already there; to create

a new reality with our tools” (Maya, 2018). Richard agrees and states that for example: with “the content of 19th century history or the ‘Conservative-Liberal Republic’ one could do something” (Richard, 2018). Nevertheless, the complexity lies in the lack of information in order to work and include women and their history.

Perspectives Concerning Women’s Inclusion and Their History

The participants coincide with each other when stating that the absence of women is not caused by the lack of research concerning their history, but it is a problem of patriarchal social structures that have controlled the educational and teaching processes. Diana states that “it is a problem of society, because to ask to be included is like ‘begging’, as if we were not human beings [...] even when one speaks with another woman she does not even know if she is conscious that she is an individual. So, the problem is a society that had marginalized women for so long” (Diana, 2018). Vale agrees with these comments and says that “our society is essentially chauvinistic” (Vale, 2018).

The teaching staff claims that, in conversation with students, many female students have been victims of gender discrimination and marginalization. Karla states that in her conversations “many girls were actual victims of gender violence, they were actually victimized by their partners [...] it is very difficult to change that mentality, to teach women that that is not normal, [they] repeat violence cycles and just a few women are aware of it. In this society there is a lot of gender violence” (Karla, 2018). Diana adds to her previous comments a critique toward women’s inclusion and their history being presented as only anecdotal:

“The historical event of the women’s vote, do you think it has any relevance? It does not. However, if one comes and says why this is important, why it is useful in a global context or national context, that you did this [...] but not all teachers can do that. Firstly, because they do not believe it is relevant or simply because we do not think about it. It is a problem of society, and we, as female teachers, do not put ourselves in that position because it is easier to continue teaching as we have always taught, without making students reflect together” (Diana, 2018).

Thusly, as well as Diana the rest of the participants agree that when women are included as anecdotal or annexes, the way they are included in official plans, it contributes to perpetuate subordination toward a history built from patriarchy. Furthermore, they consider the difficulties that exist in the same society; one that generally is framed under sexist structures. Vale even states that this situation “gets so far that one cannot make any changes, patriarchy is a very rigid structure” (Vale, 2018).

Considering the stated comments, the teaching staff suggests different spaces to include women and their history. Richard states that what it is fundamental is not inclusion *per se*, but to generate inclusive educative structures: “I think the important matter is to generate a more inclusive society. One that includes groups, not only women, but groups or collectives that are made invisible, that would generate other points of view” (Richard, 2018). Maya agrees that inclusion must be oriented “toward other genders, [to] talk about homosexuals, [to] talk about transsexuals,

[to] talk about minorities, also of language and your behavior” (Maya, 2018).

Diana adds, agreeing with her peers, that the educational structures are based on hegemonic and masculine guidelines of the state concerning the citizens’ formation: “the educational structures are neither created by women, nor for women, nor to form an inclusive society. These simply answer to form obedient citizens that exercise their civil rights and maintain the order of Chile” (Diana, 2018). Karla adds that within the patriarchal structures, one of the fundamental aspects to change is related to gender judgement and gender stereotypes where women are presented as subordinated toward powerful men, which can change concerning:

“Whenever the topic of women is discussed, immediately one goes to the subject of feelings- the affectivity- as if women were only feelings and no rationale. Young women need to be shown that they are equally capable of studying, of being rational, that they are not ruled by their hearts, that they can go further. They can discover themselves as women, not inferior, on the contrary; capable of carrying out their history” (Karla, 2018).

As the female and male teachers express: to promote an education that includes women from the questioning of the patriarchal structures point of view could be possible in order to establish spaces for the girls to reflect on the marginalization that they have suffered and thus to propose transformations. Richard, concerning inclusion and transformation of the official educational structures says that it should be done in consonance with the content; focused on changes to the traditional approaches: “I believe that it should not be treated as a separate topic because this generates exclusion, segregation. Traditional approaches must be changed” (Richard, 2018).

Teaching Practices in the First Year of Teaching

Maya suggests that in order to accomplish what they have stated they face the problem of didactic formation. In other words, they agree that they do not have the necessary tools to generate transformations to the educational system, as to propose women’s inclusion from critical perspectives:

“I believe that there is also a problem in tools given in history teaching programmes, more than just in the curriculum. In general, the problems happen in the mayor’s programmes [...] we as individuals, as teaching professionals we have the capacity to link it with what we claim [...] because I am a woman, we can see it from a different perspective and what we can achieve as teachers” (Maya, 2018).

Diana adds, in relation to the lack of tools in didactics during the professional formation, that it is crucial to include women as well as to propose transformations. For her, in her first year as a teacher it has been complex to generate proposals of inclusion: “If you have a teaching formation where women’s historical sources are not included and they are scarce, to deliver these sources to the classrooms is very complex since there is no formation, didactics knowledge and tools concerning this.”

Thus, Vale adds the labor of the teaching staff to include women and their history should not only be about an education

based on content, but mainly on values: “as women, we have everything against us, a chauvinist system, but I feel that a woman and teacher has the role not only to teach contents concerning women [...] I believe that we need to draw on values to generate ruptures in the chauvinist system” (Vale, 2018).

Richard and Vale agree with what has been stated until now, where the priority is the formation in didactics in order to have tools that collaborate in suggesting spaces of educational transformation. Both add that it has been complex to suggest new spaces and content in their first year of teaching: “I believe that didactics are fundamental [...] it shows you the teaching practices in the classroom [...] that teaching and learning is not only repetition, that it is not mechanical, but transformational” (Vale, 2018).

Karla also comments about the difficulties that she has had in her teaching practice where she has made efforts to include women and their history. However, students themselves have manifested difficulties to understand the break of the traditional contents that they see in class:

“In my case, colonial history was the most challenging [...] I tried to give explanation about a Mapuche woman’s witch craft trial, which was a text that a female historian had written [...] to see the Mapuche woman, the ‘machi’, mostly as a witch being judged and everything that that woman went through is hard because they [the students] did not understand some concepts [...]” (Karla, 2018).

Maya comments about her teaching practices, and that she has included women looking to give meaning to her work:

“My logic is to give sense to these facts and events, and to work or link the student to the facts through practical matters that they see in their daily lives [...] given that history is not so distant, it is part of them [...]. For me, that is the aim of studying history; not only to understand what happened or why it happened, but to understand how what happened influences us, what does it get to [...]. It is possible to give a different meaning to history in people’s everyday life and that is much more than just dates and years. It is to give meaning to our present from past events [...]” (Maya, 2018).

In Richard’s experience he expresses that because of the school’s curricular organization where he has worked, he had to exclude the approach to women and their history due to the fact that it did not make sense with the content seen in class, further; because of the pressure of his educational center:

“What I did in my teaching, 20th century Chilean history, according to the school’s textbook plan, we had to work on the subject of women. It was separated, as a unit: “Women and the vote” [...] I discarded it because of matters of time versus content. So, I planned my classes within the framework of two lines: “economy and politics” and a bit of “social” [...] then the unit or the section of women was in the middle of the content without any sense, women related content did not fit with the rest of the content. It did not make much sense, there was no correlation in the plan, I might have mentioned it but it was not a class about it” (Richard, 2018).

Diana, at the same time, explains that she has also experienced the pressure of the educational centers and the disconnection of women’s approach and their history in function to the rest of

the content: “what happens is that one focuses in politics and economy. One sees gender in the classroom if there is enough time when it should be mandatory” (Diana, 2018). Richard adds that in the educational centers and their practices, the problem lies in that women and their history is seen as an annex to the official history led by men: “at least in what I saw [...], there is an attempt to include women. In Chilean History, at least women are included but in a separate section when women suddenly make an appearance politically and participate, but then women disappear and have no major continuity” (Richard, 2018).

Lastly, Diana states that the content related to women and their narrative; their actions have been denied and made invisible from the patriarchal construction of history. In her opinion, the solution must be to transform the structures and the history teaching practices with the purpose to include the voices of women in coherence with the content: “in general women, feminism and everything we could say is a recent topic in history [...]. I think that if we see gender history or content related to women in class, it has already been discriminated because it should not be apart from the rest [...].” (Diana, 2018).

DISCUSSION AND CONCLUSIONS

In regards to the professional formation the participants have received, all of them have been instructed based on traditional logic where the State’s hegemony and masculine leadership has prevailed (Apple, 1998, 2014; Giroux, 1998; McLaren and Kincheloe, 2015). Considering critical theory, the powerful social structures promote that some content is privileged over other, these being controlled by the patriarchal protagonism and power (Pagès and Sant, 2012; Ortega-Sánchez and Pagès, 2018). As the participants argue, the contents that control the scholastic structures perpetuate those which produce and reproduce privileges, and also male undertakings over the inclusion of a diversity of protagonists (Donoso-Vázquez and Velasco-Martínez, 2013; Aguilar Ródenas, 2015; Balteiro and Roig-Marín, 2015).

All of the participants agree that the school promotes the production and reproduction of national values and national belonging (Donoso-Vázquez and Velasco-Martínez, 2013; García Luque, 2013; Díaz de Greñu and Anguita, 2017), where men who have had political, military and economic power are the ones who play a leading role and arise as builders of historical processes (Woyshner, 2002; Rodríguez Martínez, 2014; Crocco, 2018). It is claimed that educational centers as well as history teaching looks to perpetuate the “tradition” such as hegemonic axis, which experiments little variability and furthermore does not allow the inclusion of new narratives and characters (Barton, 2002; Foucault, 2008; Scott, 2008).

Hence it has to be understood that the national curriculum that the participants work with is built from hegemonic and State official structures where knowledge is understood as external to people. (Vega, 2002; Bickmore, 2008; Díez Bedmar, 2015). As Foucault (2008) states, the power structures have normalized roles and gender structures. Thus, the curriculum produces and reproduces the hierarchies that have positioned women under

the actions of men that have had power in society (Bonilla and Martínez, 1992; Scott, 2008; Pagès and Sant, 2012; Díaz de Greñu and Anguita, 2017).

As the participants claim, women, and their history are presented in an anecdotal manner and as annex to the official history (Marolla, 2019a,b). The few times these are presented, it is from a domestic and private points of view being their actions subsidiary to the ones powerful men have performed (Tomé and Rambla, 2001; Barton, 2002). Appleby et al. (1994), Tomé and Rambla (2001), Barton (2002), Donoso-Vázquez and Velasco-Martínez (2013), and Crocco (2018) have claimed that teaching has excluded women and their history in order to perpetuate unequal social structures; giving privilege to a passive perspective on the participation of the individual and the changes that they could make.

Concerning professional formation, the participants state that they have not received the ideal tools to include, problematize and work women’s narrative. While they claim that they have knowledge that there are sources that could be sought for, they have not received instruction in didactics that allows inclusion. The teaching practices, in that sense, are performed from endocentric conceptions that provoke the production and reproduction of gender inequality.

The practices that have been performed, the participants recognize, perpetuate gender structures (Marolla, 2019b) where they have raised the actions of men over the actions and protagonism of women in history (Benavente and Núñez, 1992; Crocco, 2008; Pagès and Sant, 2012; Fernández and Johnson, 2015; Ortega-Sánchez and Pagès, 2018). Regardless, the teachers argue that they have made some changes making women visible within the content seen in class. This, however relevant, has been framed in the traditional gender structures. Women not having a major participation in the construction of history has continued reproducing and normalizing.

The participants comment that in their first year of teaching, it has been complex to be able to modify the curriculum forced by the educational centers and the State, as well as the pressure of the standardized tests. However, they argue that in schools there are feasible spaces to be transformed with the objective of including and working with women’s narratives, their protagonism, and their actions (Lerner, 1979; McIntosh, 1983; Pagès and Sant, 2012; Marolla, 2019b). The participants add that inclusion should be done with the purpose of transforming all the androcentric structures of history and social sciences teaching (Grever, 1991; Volman et al., 1993; Azorín, 2015; Fernández and Johnson, 2015).

The participants, faced with the aforementioned matters, claim that in their first teaching year they have made efforts to generate brief disruptions in tradition and unequal gender structures. They claim that one of the strategies is that history teaching should be taught as something close to the students, stressing how the teaching processes can be related to everyday life (Subirats and Brullet, 1988; Subirats, 2001; Aubert et al., 2010; Donoso-Vázquez and Velasco-Martínez, 2013; Díez Bedmar, 2015). As Heimberg (2005), Pagès and Sant (2012), and Ortega-Sánchez and Pagès (2018) say, history and social sciences teaching must allow students to identify with the processes and this way actively participate in society (Heimberg, 2005; Del

Olmo Pintado and Gutiérrez Sánchez, 2006; Aguilar Ródenas, 2015; Fernández and Johnson, 2015).

It is important to mention that the participants agree that women's inclusion could be promoted so the girls feel identified with the actions of their peers over history (Vázquez, 2003; Scott, 2008; Fernández and Johnson, 2015; Marolla, 2019a,b). This would be in the service of creating agency where the female students could understand that they are also developers and protagonists of historical processes (Alonso Gutiérrez, 1998; Vavrus, 2009; Stanley, 2010; Crocco, 2018; Marolla, 2019a). Not only female students could generate agency regarding their participation in history but male students could understand that history has been built stressing masculine over feminine protagonism, situation that answers to hegemonic interests (Levstik and Groth, 2002; Heimberg, 2005; Vavrus, 2009; Crocco, 2010; Balteiro and Roig-Marín, 2015). This empowerment would imply that male and female citizens participate socially to fight against gender inequality (Álvarez de Zayas and Palomo Alemán, 2002; García Luque, 2013; Fernández and Johnson, 2015; Marolla, 2019b).

Lastly, it is relevant that the participants agree, in tandem with Casas (1999), Subirats (2001), Thornton (2010), and Aguilar Ródenas (2015), by claiming that in their first year of teaching practice it has been complex to include women and their history, and they have made efforts to disrupt the pressure in the educational centers and the official curriculum. Nevertheless, these efforts have not produced the expected results since they stress that: firstly, they do not have the necessary tools or formation in didactics; secondly, their little experience in teaching practices leads to them being restricted to what is enforced official programmes. Thusly agreeing with Hahn (1996), Woyshner (2002), Bickmore (2008), and Hess (2002) who state that the formation and reflexive practices are fundamental to generate educational transformations.

Amongst the main conclusions that can be obtained, the relevance of research concerning the initial teaching practices is stressed. As the participants have manifested they agree on the importance of women's inclusion and their history in teaching, even so, they express a number of worrying situations to those who work in teaching teachers.

This way the teachers express criticism of the formation they have had. These comments are in tandem with the studies of Pagès and Sant (2012), Ortega-Sánchez and Pagès (2018), and Marolla (2019a), who, in a similar way, express what was said in the research; that the content and processes that have been learnt in their programmes are ruled by traditional structures of history. These structures are based in male protagonism stressing their actions and narratives over the rest of the characters.

Women's inclusion and their history are carried out from anecdotal positions or as annex data to official history with men as protagonists. History teaching is presented from patriarchal points of view, being women the spectators of the tales, narratives, and the actions. This means that the students identify that history has been built from the actions performed by men where women have had neither participation nor interference in the social progress.

Lerner (1979), McIntosh (1983), and Pagès and Sant (2012) propose a work model for the understanding of teaching practices

from a perspective of gender and inclusion of women in teaching. This model can be summarized in the following stages (Table 2).

These models agree that, in general, history teaching does not include women and their history. Except in those areas and tasks that have been identified as "women's activities"; no historic narratives have been recovered, being androcentric history that includes them in an anecdotal and subordinate way in the history that includes masculine protagonists. The model proposes their inclusion from the transformation of traditional practices and structures (Grever, 1991; Volman et al., 1993; Aguilar Ródenas, 2015; Díez Bedmar, 2015). Inclusion from those perspectives would collaborate with the recognition of the students' particularities, supporting identification with the past and their position in today's society (Heimberg, 2005; Del Olmo Pintado and Gutiérrez Sánchez, 2006; Azorín, 2015; Fernández and Johnson, 2015).

Thus the participants add that in their professional formation they have not worked with content and processes linked to women's history, their narratives and voices. On the contrary, it has been focused in traditional content with powerful male protagonists, because of politics, economy and/or military aspects. Hence they agree that the professional formation they have had has come from patriarchal and androcentric structures making women as well as those who represent social diversity invisible.

In this context, the participants also comment that the didactic courses have not prepared or formed them to create spaces that include women and their history. On the contrary, the formation has focused on preparing them to work and teach from the *status quo*. Although they recognize the importance to include women and their voices, so much that boys and girls could identify themselves as developers of their own history, as to generate social transformations to inequality, they do not have the tools or the reflection concerning reflexive practices to propose changes to the educational centers and the compulsory programmes.

It is crucial that the professional formation is recognized by the importance to transform the traditional viewpoint of history and social sciences teaching. All the programmes should be reformed from a logic that not only promotes the questioning of patriarchal structures, gender, race, and social class inequality, but that it is also thought to promote changes in teaching practices, official programmes, and the educational centers impositions.

Didactics comes to be crucial as an axis to create spaces of transformation in current teaching practices. The context in which one works, in general, is going to be problematic which is why the teaching staff should have the necessary competences to face problems, as well as to suggest solutions and transformations. Here is that didactics, as the teaching staff recognizes, becomes essential in order to be reflective- in practice (Donoso-Vázquez and Velasco-Martínez, 2013; Marolla and Pagès, 2015), so to count with enough tools that allow teachers to face the different contexts.

One of the main advantages of women's inclusion and their narrative in history teaching is recognized when stating that girls could identify themselves with historic characters seen in class,

TABLE 2 | Inclusion of women in teaching.

Lerner (1979)	McIntosh (1983)	Pagès and Sant (2012)
Male-defined history	Womanless, all-white history	History without women
Compensatory history: missing and notable women are added	Corrective history, also known as the exceptional other history	History and women
Contribution history; women's contributions to male-defined society are highlighted	Issues history; sexism and patriarchy serve as interpretive frameworks to women's history	Women's history
Oppression framework; women's history told through terms of oppression. Women on their own terms history	Alternative starting point history; women's lives as history there's nothing too humble to study	The story for women
Female oriented consciousness in history; experiences of women in the past are valued and become the interpretive framework	History redefined and reconstructed to include women's ways of being. Knowing, living and loving	History from women
Male-defined history	Womanless, all-white history	History without women
Compensatory history: missing and notable women are added	Corrective history, also known as the exceptional other history	History and women
Contribution history; women's contributions to male-defined society are highlighted	Issues history; sexism and patriarchy serve as interpretive frameworks to women's history	Women's history
Oppression framework; women's history told through terms of oppression. Women on their own terms history	Alternative starting point history; women's lives as history there's nothing too humble to study	The story for women
Female oriented consciousness in history; experiences of women in the past are valued and become the interpretive framework	History redefined and reconstructed to include women's ways of being. Knowing, living and loving	History from women

Font: Lerner (1993, p. 145–153), McIntosh (1983, p. 32–34), Woyshner (2002, p. 359), and Pagès and Sant (2012, p. 102).

assuming that they are also part and developers of historical processes. In this way they could empower themselves when faced with social issues and inequality, therefore, helping them to participate in generating changes in the context of social justice.

Lastly, the teaching staff recognizes the importance of their teaching work in the context of a socially troubled society. They claim that their role is more than delivering content and that the students continue under an economy based educational logic (Pagès and Sant, 2012; Azorín, 2015; Díaz de Greñu and Anguita, 2017; Ortega-Sánchez and Pagès, 2018; Marolla, 2019a,b) but that their main function is to deliver the competences and tools so that the students can feel empowered by and actively participate in the fight against the inequality that they are part of.

DATA AVAILABILITY STATEMENT

The datasets for this article are not publicly available because the data sets are not definitive and are in the process of being extended. Requests to access the datasets should be directed to jesusmarolla@gmail.com.

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ETHICS STATEMENT

The studies involving human participants were reviewed and approved by University of the Americas. The participants provided their written informed consent to participate in this study.

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Nine Contradictory Observations About Girls' and Boys' Upbringing and Education – The Strength-Based Approach as the Way to Eliminate the Gender Gap

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Several studies in the 1970s and 1980s have showed how girls' courage or willingness to bring out their talents and strengths at school is hindered by many factors. The self-esteem of girls who are known to be talented decreases especially during their adolescence. This phenomenon is connected to girls' ability to notice conflicting expectations in their environment. They realize that they are expected to possess certain traditional female characteristics such as passiveness, adjustment, sensitivity to others' expectations, and altruism. They are not expected to show competitiveness. At the same time, girls are expected to perform well at school. Girls learn to regulate their behaviors and study quietly, but this could also hinder their talents to come forward. Still, they pursue perfect scores that eventually do not bring them satisfaction. Earlier research has showed that teachers treat girls and boys differently, based on stereotypical assumptions about troublesome boys and compliant girls, and they also interpret reasons for girls' and boys' behaviors differently. The 21st century seems to both repeat and question many of the research results about gender differences. In this article, we analyze gender gap through nine viewpoints by presenting contradictory research results about girls' and boys' upbringing and education. It is crucial that each individual can develop their own strengths for the best of themselves and the society – regardless of their gender. As the conclusion we present the role of strength-based teaching as the means to promote gender equality at school. It is based on the ideology of positive psychological research and on the fundamental idea that strengths belong to everyone. The ability to recognize and use one's strengths has not only personal benefits in terms of increased life satisfaction but also societal benefits as strengths help facing adversities, overcome difficulties, and prevent malaise, and increase wellbeing in general. When people flourish, not only the people but also the society succeeds—and it all starts from school. The strength-based approach can direct teachers' attention away from good-girl-expectations to universal and genderless strengths, and help girls find success in life that is based on well-being and profound understanding of one's potential.

Keywords: human strengths, strength-based teaching, school, teaching, education, gender gap

INTRODUCTION

Girls and boys are being upbrought often differently, which can be also unconscious or involuntary action. However, the outcome is that their self-conceptions and worldviews become different. Girls and boys register clues from various directions: home, daycare, school, youth culture, social media, marketing and information society, entertainment industry, advertising, and culturally adopted behavior models and expectations mold their behaviors (Sax, 2017). The debate whether differences between genders depend on individual, biological, and cultural factors or just different emphases in upbringing and education is still ongoing (Baron-Cohen et al., 2004). Yet, individuals are different regardless of their gender.

In order to renew education, it is important to spot the critical points of education and upbringing. The purpose of this article is to view especially girls' success in education and at work based on earlier – and partly contradictory – research. We will highlight ten themes that bring out and question the differences in how girls and boys are treated, influenced, and socialized. Finally, we will discuss how to promote girls' success by leaning on their own strengths in education and at work. The strength-based approach is considered a way to enhance individual flourishing and how people can utilize their strengths for positive personal and societal positive development (Uusiautti and Määttä, 2014). Everyone has their strengths, but some may not discover them or strengths can be left unused. Schools and teachers differ in their ability to help students flourish in this sense. Therefore, it is not granted that school education would help students recognize their strengths because limited resources can be focused on many other goals that promote societal competitiveness (Määttä and Uusiautti, 2012).

Despite many efforts to increase gender fairness in education in recent years, the issue has not yet become obsolete, and according to some viewpoints, gender discrimination still exists (Kollmayer et al., 2018). What kind of solutions would the strength-based approach bring to individuals' success and well-being in a society that necessitates multiple skills, creativity, different abilities, leadership skills, empathy, encouragement skills, and ability to promote others' potential? To build better and more equal future, we need to carefully elaborate the critical points of current education.

In this article, we present our highlights from reviewing research across the world from 1970s to 2010s. The articles chosen in this review deal with boys' and girls' education, upbringing, and growth, and represent mainly educational psychological viewpoints to the issue. After careful reading, several contradictory observations were found that were evaluated and summarized into nine. The relationship between these observations is based on the way they provide conclusions about girls and boys, their differences and similarities at school, in education and work, as well as how they are educated and raised. Through presenting research results that appear contradictory we want to discuss the multidimensional nature of this phenomenon.

NINE CONTRADICTORY OBSERVATIONS

(1) Girls' and Boys' School Success Is Different in Nature?

According to studies, girls succeed better at school than boys do. Actually, the phenomenon that girls earn better school grades than boys is observed in many countries (Freudenthaler et al., 2008). Gender differences in educational attainment are seen at the foundation stage of primary education and continue through to the secondary education examinations taken at the end of compulsory education at age 16 (Määttä and Turunen, 1991). National statistics that document these trends have consistently shown that girls' attainment in literacy and language tends to be higher than boys' attainment at all stages. Whereas the gender difference in math is smaller than for literacy and language, girls also continue to perform slightly better than boys (Mensah and Kiernan, 2010).

It is no longer girls but boys who seem to be left behind at school (Houtte, 2004; Jones and Myhill, 2004). Differences in school success and the so-called gender gap in educational achievement have been explained by girls' and boys' cognitive abilities, individual characters, personality and motivational variables, parents' education levels, social status, and so on.

Counter-arguments:

The current debate has aroused the question of whether it is merely boys who are underachieving than girls that are succeeding better at school (e.g., Hyde, 2005). Actually, some critique has been addressed to the fact that differences between genders are not that large than, for example, differences between other types of students groups (Mensah and Kiernan, 2010). The country-specific educational systems do have their own role as well (e.g., Van Langen et al., 2006), when it comes to features of the level of inclusion and equality in general (Määttä et al., 2018).

Individual differences within and between girl and boy groups can also be explained by their peer relationships. It is a fact that acceptance by peers is crucial because peers form the main reference group for adolescents. As such, there is a big chance that peers at school will function as a normative reference group. Indeed, the relationship between students is the most influential factor determining how students succeed at school (e.g., Warrington et al., 2000). The meaning of peer culture becomes evident in other studies too. For example, some research shows that the more there are girls in a school the better the boys will succeed (Van Houtte, 2004).

(2) Girls and Boys Are Being Raised Differently at Home?

Several research studies end up with the conclusion that parents are the most important socializing agents for children before they go to school. They act as models, share their knowledge and expectations and reward desired behavior (Kollmayer et al., 2018). The moment a child is born the child's gender arouses certain stereotypical expectations in parents (Lytton and Romney, 1991). They treat the child based on these expectations: girls are seen weaker and needing protection

whereas boys are considered strong and active (Tenenbaum and Leaper, 2002). In addition, for example, a children's rooms are decorated using gendered colors and children are dressed in gender-typed clothing (Rheingold and Cook, 1975; Pomerleau et al., 1990).

The difference between girls' and boys' upbringing has been identified as, for example, girls being encouraged to stay close to home and adults and to interact with adults. Girls learn to pay attention to adults' hopes and are sensible to respond to their expectations. This is how girls' development in social and linguistic abilities is emphasized in upbringing. In all, parents talk to girls more than to boys (Määttä and Turunen, 1991).

Boys are being treated more harshly and strictly. They spend more time outside home and with peers, especially with other boys. Boys have been encouraged to physical activity and exercise (Eaton and Enns, 1986). Boys are considered to be able to take care of chores earlier and to be more initiative than girls (Määttä and Turunen, 1991).

Counter-arguments:

The parents' role and significance in upbringing cannot be underestimated. That being said it is also worth remembering that parents are not a homogeneous group and within the family, parents may have different kinds of role in relation to children, school, and other people (LaRocque et al., 2011).

Parents' beliefs about education strongly determine how they participate in their children's schooling (Hornby and Lafaele, 2011). Some parents do not feel adequate to the task of supporting their children because of their own low level of education (Pena, 2000). According to other studies, parents' involvement can be supported by positive reinforcement: positive interaction and contact from the teacher make parents feel capable and willing to participate in education (e.g., Leskisenoja and Uusiautti, 2017).

According to Pena (2000), parents involvement appears as school involvement, cognitive-intellectual involvement, and personal involvement. While school involvement means concrete activities at school and at home, cognitive-intellectual and personal involvement are more intimate activities such as mutual intellectually stimulating activities and interest in children's thoughts and well-being. However, parents' beliefs about their children's abilities partly determine the nature of their involvement (Hornby and Lafaele, 2011). For example, stereotypical beliefs may lead to greater support for girls.

However, there is lack of findings about how differently mothers and fathers raise boys and girls. A good question is whether there are even more similarities than there are differences. For example, Cabrera et al.'s (2012) study among low-income families showed that the way parents' treated girls and boys (e.g., spanked them) was inconsistent when other variables (such as the level of depression or chaos in the home environment) were analyzed. What can be said is that parents' socioeconomic status, parent beliefs and expectations, and parental styles and behaviors vary (Penner, 2018). Eventually, the most important finding probably is that both mother's and father's love predict the child's happiness later in life (see Sillick and Shutte, 2006)—regardless of the child's gender.

(3) Educators Prefer Different Kinds of Plays and Games?

According to earlier research, educators encourage children consciously or unconsciously to different types of plays and games (Blaise, 2005; Chapman, 2016). For example, in Lindsey and Mize's (2001) study fathers preferred more physical activities with boys and reading activities with girls. It is even possible to categorize toys based on whether they are masculine or feminine (Blakemore and Centers, 2005).

In accordance with traditional gender stereotypes, parents perceive science, technology, engineering and mathematics as less suitable for girls and languages as less suitable for boys (Tomasetto et al., 2015). These stereotypical assumptions also direct how parents and educators guide girls and boys to play.

Counter-arguments:

The home culture and children's different personalities, temperaments, activity, and social features guide parental behavior and choice of plays and games regarding individual children. For example, girls and boys tend to differ in overall levels of aggressive behaviors. Girls seem to be less aggressive and socially more capable than boys (Hoglund and Leadbeater, 2004). However, it is also necessary to think about the child's age. Activities and games change according to the child's age but not necessarily to the child's gender (Kennedy et al., 2004; Leavell et al., 2012).

(4) Children Play in Different Ways?

Based on research, it seems that there is no girl who would not have played home (Taylor and Richardson, 2005). Playing home and nurturing baby dolls teach social interaction and empathy skills. Girls also seem to prefer reading and pottering that enhance linguistic abilities and handicraft skills (Lynch, 2015). Boys prefer exercising, mutual competitions, technical and electronic equipment. These activities develop independence, initiative, and active participation (Endendijk et al., 2014).

Counter-arguments:

Research on how children play has focused on describing children's peer relationships, group memberships, and personality traits (such as shyness or withdrawal) (Coplan et al., 2004; Rubin et al., 2009). According to Boyle et al.'s (2003) study, children's play typified four purposes where the child's gender was not the determining factor. Sometimes, activities and games are determined by gender but gender does not always define what is done together. Playing has a central role in children's development because it allows them to practice and try different roles, interaction, and numerous overlays of emotion—joy, anger, frustration, embarrassment, rejection, humiliation, and fear.

(5) Learning Materials and Media Strengthen the Stereotypes

Text books include plenty of stereotypical assumptions of what is suitable behavior to girls and boys (Filipović, 2018). The following roles have been noticed from text books: boys are sharp, creative, bold, adventurous, independent, and resisting. They do not care about their looks. They compete but do not show their

emotions or fears. Girls are passive and dependent. They pay attention to others and sacrifice, stay at home and admire boys. They are allowed to show their fears but often they are described as lonely who use their time, e.g., taking care of their appearance (Määttä and Turunen, 1991).

In addition to aforementioned roles, girls and boys appear differently in text books: boys are mentioned about three times more often than girls and include expectations about gender-typical behaviors (McCabe et al., 2011). In this way children's literature also tends to strengthen stereotypes (Filipovič, 2018).

Counter-arguments:

It is essential to pay attention to how text books and children's books are being read and discussed. The way in which adults interpret books for children may have even more impact on children's understanding of gender roles than the actual content of the books (Kok and Findlay, 2006). Media and social media as well as online learning materials bring new viewpoints to children's studying (Krijnen, 2015). Media education is crucial not only for critical analysis of information but on how children learn to read hidden messages about their gender and gender roles presented in various media (e.g., Kelly et al., 2018).

(6) Girls Are More Adjusting and Stay in the Boys' Shadow in the Class?

The written curriculum is the same for boys and girls. Equality is a core objective in Finland and elsewhere (Subrahmanian, 2005). Alongside the official curriculum, the hidden curriculum that refers to what students actually learn and experience at school (Barow, 2004; Fan, 2011), must be taken into account. All activities at school are not always following the objective of legislation and curriculum.

The difference appears in many ways. For instance, teachers have to give directions usually twice: first to everyone and then separately again to boys. Boys are more active, outgoing, and dominate the classroom situation thus receiving more attention from teachers (Younger et al., 1999). This is implicitly accepted, but explicitly teachers tend to report that they treat girls and boys equally but according to observation research, boys get more of their time (Younger et al., 1999; Beaman et al., 2006).

Understandably teachers dominate the speech and use most of the time talking: teachers talk about two thirds and students one third of the time (Harrop and Swinson, 2011). However, of the student time, boys use the most while girls stay quiet and adjust to their role of pleasing the teacher (Swinson and Harrop, 2009). Girls reply when being asked, boys do not ask for their turn but take it without permission. Boys are more active and produce contents to classroom talk in the form of jokes and other activities (Danby, 1998). Teachers also talk to girls and boys differently: boys are treated more negatively. Girls are expected to behave nicely and reach better achievement, and teachers do not yell at girls.

Counter-arguments:

Perhaps girls are not so adjusting after all but better at figuring out the social game. They create their own cultures, they are able to use their voice, bend the rules, and hide their activities from teachers. Tolonen (2001) uses the word "tactics" when describing

girls being able to understand how they can maintain their own activities (e.g., chatting with other girls) without making teachers angry.

Thus, the old-fashioned assumptions of girls achieving better results by just working hard and helping (Foster, 1996; Renold and Allan, 2006) can be contradicted by research that reveal girls' personal experiences of how to level the expectations of being a straight-A student without sacrificing the feminine "beauty" (Renold and Allan, 2006). Girls are aware of these conflicting expectations and have developed skills to cope with the situations in socially clever ways.

(7) Girls Adopt the Role of a Nice Girl?

Due to seemingly (see counter-argument in section "Girls Adopt the Role of a Nice Girl?") calm behavior, girls are given the role of a nice girl in the classroom. They do not make trouble and support the teacher in a restless classroom. They learn that these kinds of characteristics are expected from them—but also to perform well at school (Combs and Luthans, 2007; Hyvärinen et al., 2015).

On the other hand, conflicting expectations may lead to girls hide their talents and lose their potential. They can be afraid of losing their feminine side and social acceptance if they aim at success (Duguid and Thomas-Hunt, 2015; Määttä and Uusiautti, 2018). Likewise, perfectionism can prevent talents to come forward (Adderholt-Elliott, 1989). Combined with over-responsibility and conscientiousness, achievements may never feel satisfying. Need for acceptance, fear of negative feedback, and pursuit of avoiding mistakes may lead to underachievement and other problems (see e.g., Savukoski et al., 2011).

Lacking self-esteem and self-confidence has been presented as one reason for why girls tend to underestimate their educational chances and make less ambitious choices than boys. Nice girls' life-styles represent the problem of adjusting one's own interests with the social responsibility and others' expectations (Walkerline, 1998). While traditional expectations have guided women to pay attention to others' needs and altruism, the modern challenges are intertwined with individualism and self-fulfillment (Baumeister, 2013). Nice girls have to adjust to male ways of doing things while developing their autonomy and own ways of building close relationships (Rogers et al., 2020).

Counter-arguments:

The nice girl role does not exclude courage and power, strength and resilience. Girls and boys have always had different kinds of roles and tasks. While women have been in the shadow, today the realization of equality has changed this setting. For example, the concept of girl power, which was originally introduced by a punk-type movement Riot Grrrls (Downes, 2007), refers to appreciation of girl culture and wants to redefine it. The idea is to create an image of a successful woman who is creative, ambitious, self-confident, straight-talking, and decides about her own life. She is not afraid of taking the power to herself. The motto was that girls do not need anyone's permission but are free to make their own decisions in whatever situation.

Taft (2004) interprets girl power as individual power or consuming power in which fashion, consuming, and sexual confidence can be seen as the opposite of true empowerment. As

girls were recognized as a group of consumers, they were soon tried to suppress as servers of markets by giving them an arena to interact their power through clothes and accessories (Jackson and Tinkler, 2007; Tolman, 2012). However, this tendency was not working for women or their empowerment but increase comparisons and gnaw their self-confidence (Ward, 2002; Lamb and Brown, 2007). McRobbie (2009) pointed out that, ironically, the girls' empowerment was shaped into the power to conform and perform the new perfect girl.

Through the rise from a good girl to active and aggressive girl power, development from one extreme to other, the modern girls are finding their ways of ignoring the ready molds they are supposed to adjust.

(8) The Teacher Reproduces Gender Differences?

Several research show that teachers are well aware that the way they teach can be considered stereotypical (Gray and Leith, 2004; Skelton et al., 2009). While acknowledging this problem, they find it difficult to change partly because these activities happen unconsciously (Gray and Leith, 2004).

On the other hand, the school culture has been claimed to be based on feminine culture and thus favoring girls (Carrington and McPhee, 2008) because the teacher is more often a woman (Drudy, 2008). In order to support boys' development, it would be necessary to have more men as educators and teachers (Carrington and McPhee, 2008).

Counter-arguments:

According to research, the gender of teachers had little apparent effect on the academic motivation and engagement of either boys or girls and they value teachers of any gender as long as the teacher was teaching consistently and supported the students (e.g., Carrington et al., 2007). The ethos of gender-neutrality has been consciously promoted in many countries such as Sweden and Finland (Mattila, 2005). Although it has its extremes, equality is a principle that needs to be considered—always. However, gender differences have become such a sensitive topic that people may find it even difficult to address.

When it comes to teachers, they have become more capable than ever to analyze and interpret their own methods and activities. In Finland, this has been ensured by research-based teacher education (e.g., Uusiautti and Määttä, 2015). They are open to perceive traits that otherwise would have been ignored or unquestioned. Teachers also have become able to make solutions in situations in which students themselves reproduce gender differences.

(9) Men Are More Successful Than Women?

Although women are more likely than men to graduate with advanced degrees, this type of success does not mean that they would be more successful in the world of work. Women's salaries are still lower than men's and careers still seem to face the glass ceiling (Koch et al., 2015). According to Leslie et al. (2017), men do reach better positions and negotiate pay increases better than women. Women also bear more responsibilities at home and

child care, despite the ideal of equal opportunities to combine work and family. The difference between men's and women's success has been explained by numerous ways ending with finding that girls are successful at school but the features needed in this type of success is not what are needed in the world of work (Joshi et al., 2015; Steinmayr and Kessels, 2017).

Counter-arguments:

Women have progressed in their career development so that the proportions of employees working under female supervisors have increased in almost every EU country since 1995 (Määttä and Uusiautti, 2018). Although the change has been powerful, women still have less leadership positions than men and find it more difficult to combine work and family than men (Van Steenbergen et al., 2007). On the other hand, the interplay between these two areas of life has positive consequences (Colbert et al., 2016), and men have started to use more and more time with housework and childcare during the past few decades (Uusiautti and Määttä, 2018). Having a family does not prevent one from having a successful career, too. It seems, that it is more important to be ready to make compromises and to take both spouses' hopes in the consideration (Uusiautti and Määttä, 2018). Furthermore, success is not only defined as an opportunity to advance to a leadership position. True success is merely found when one feels that one can flourish at work and have a sense of self-fulfillment (Uusiautti, 2016).

According to research, gender has an influence when seeking employment if the persons recruiting are aware of the applicant's gender. When the decision maker has enough other information about the applicant, the decision will be made based on e.g., skills and relevant experience, but if lacking important information, the applicant's gender is likely to influence the outcome (Landy, 2008).

Success can be viewed also more widely than just career development. Now also girls have the choice of choosing between education, family, and work, and it is the matter of merely doing the right choices for one's own well-being and happiness (Aapola et al., 2005; Uusiautti and Määttä, 2015).

CONCLUSION: THE STRENGTH-BASED APPROACH AS A SOLUTION?

The different research results that are sometimes quite contradictory as well reveal that girls and boys can be analyzed and viewed in many ways in educational contexts. The clear need is for approaches that support all kinds of learners, and their gender is not the determining factor of how they should be taught. It is also evident that different education and upbringing between girls and boys produce self-fulfilling prophecies of stereotypical assumptions and practices, which limit children's opportunities (Wingrave, 2018). Teaching can also focus on children's strengths and talent, and promote their flourishing. The strength-based approach (Carman, 2005; Linkins et al., 2015; Salmela and Määttä, 2015; Salmela and Uusiautti, 2015; Seligman, 2015) aims this kind of flourishing and is based on research conducted within the field of positive psychology

(Peterson and Seligman, 2004; Seligman et al., 2009; Bernard and Walton, 2011). Strength-based education thus leans on the idea that every human being has their signature strengths (e.g., perspective, perseverance, humanity, fairness, etc.) and that by focusing on the strengths, recognizing them and applying them in various areas of life, one's development is more balanced, shows well-being, and enhances coping with adversities in life.

Every individual has their own strengths and resources (Yeager et al., 2011). The strength-based approach gives emphasis on the recognition and development of characteristic strengths so that people learn to trust in their abilities and become able to make favorable choices and thus represent positive agency (Carman, 2005). The positive self-conception promotes positive and active citizenship and wish to contribute not only to one's own but also others' well-being. When it comes to teaching, the strength-based approach explicitly names the goal to help individuals develop and flourish (Norrish et al., 2013).

Strength-based teaching contributes to students' learning and success by providing them with positive learning experiences, initial excitement, and perceived successes, which also foster optimism, hope, perseverance, and creativity in students (Määttä and Uusiautti, 2013). A salient question concerning the strength-based approach is: What makes students seize new challenges, act actively for their own learning, and not back away from the challenges (Määttä and Uusiautti, 2013)? Therefore, strength-based teaching aims to discover students' strengths and interests that are not bound to the society's, peers' expectations or anyone else's expectations.

Teachers who adopt the strength-based approach in teaching try to find a balance between pupils' skills and expectations and between opportunities and challenges. The assumption is that it will lead to higher motivation and personal satisfaction. The strength-based teaching is also gender-inclusive because it has emphasis on the various strengths (Rios et al., 2010).

In addition to teaching, the strength-based approach can be applied in all areas of life, in parenting, leisure, and at work. In this review, we wanted to highlight it especially from the educational point of view but it is worthwhile to notice that the approach covers all aspects of life. It can be seen as the foundation that provides resources to positive development. What is not strength-based is, for example, teaching or upbringing that shows no interest in the child's personal features and interests, does not aim to positive learning experiences but merely measurable top performances (see e.g., Määttä and Uusiautti, 2012). The strength-based approach focuses on positive learning and achievements too but pursues them through finding one's signature strengths and leaning on them in a healthy way.

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HAPPINESS OF ALL GENDERS AS THE GOAL

The fundamental thought is that happy students perform better at school, use their inner resources in a more versatile manner, and are more open, courageous, trusting, and helpful than inhibited, distressed, or depressed pupils (Webster-Stratton and Reid, 2004; Gilpin, 2008; Seligman et al., 2009). People's happiness and well-being are also societally important: "a happier society overall will be beneficial to the greater good" (Gilpin, 2008, p. 3). Happy people are friendlier, less materialistic and show higher levels of self-regulation (see e.g., Otake et al., 2006; Polak and McCullough, 2006; Fishbach and Labroo, 2007) and are more co-operative, prosocial, benevolent, and "other-centered" (Lyubomirsky et al., 2005). Therefore, happiness is also connected with altruism and goodness (Gilpin, 2008) but, most importantly, "institutional settings, social practices and policies more broadly might be designed to reinforce altruism within society as a whole" (Folbre and Goodin, 2004, p. 21).

Understanding that happiness and goodness are not only important because they feel good but also because they have beneficial consequences to various students, make well-being-centered education necessary in schools (see Diener and Seligman, 2004; Äärelä et al., 2016). The idea in the strength-based approach is that the experiences of success will lead through teacherhood into teaching and learning of goodness and happiness (Gilpin, 2008; Otake et al., 2006). In order to do that students need to experience goodness, caring, and appreciation, and they have to learn to recognize the good in themselves and others without wearing the stereotypical glasses. In addition, the strength-based approach in teaching helps students to analyze and tolerate feelings of weakness or insecurity without becoming discouraged or accepting stereotypical assumptions of their characteristics. Instead, the strength-based approach provides children with a realistic view of themselves and teaches about their positive features and resources on which to lean at times of difficulties or hardships. But most of all, the strength-based approach guide the way to positive development and flourishing to all children and adults as well.

AUTHOR CONTRIBUTIONS

KM and SU drafting and writing the manuscript, and conceptualization. Both authors contributed to the article and approved the submitted version.

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REFLECT – A Teacher Training Program to Promote Gender Equality in Schools

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Despite formally equal educational opportunities for women and men, educational and occupational careers are still characterized by gender disparities rather than gender equality. Men are overrepresented in STEM fields and higher positions, while women are frequently working in low-status jobs in the health and social sector. These differences already emerge during school time, when girls report lower academic self-concepts in STEM subjects than boys even after achievement is controlled for while the same is true for boys' self-concepts in reading and languages. Gender stereotypes that are conveyed by socializing agents are assumed to play an important role in maintaining gender differences in education. Teachers are important starting points for promoting gender equality in education as their attitudes and instructional practices are known to influence students' motivation and performance substantially. To promote girls and boys equally in coeducational settings, teachers have to reflect on their own gender stereotypes. Moreover, they require knowledge about gender differences in education and about teaching methods to foster the motivation of all students regardless of their gender. However, gender stereotypes are rarely dealt with in general teacher education and training programs that build teachers' competences for reflective coeducation are sparse. Against this backdrop, we present the teacher training program REFLECT that was developed to foster secondary school teachers' competences for supporting students in developing their individual potentials without being restricted by gender stereotypes. REFLECT is theoretically based on the systemic actiotope model and aims to expand teachers' objective action repertoire (knowledge, teaching methods) as well as their subjective action space (self-efficacy beliefs, implicit theories). The results of a pilot study show the effectiveness of REFLECT. Teachers' objective action repertoire and subjective action space for promoting boys and girls equally increased, as did students' knowledge of gender differences and perception of diversity fairness in the classroom. Implementing the contents of REFLECT in general teacher education could contribute to sustainably achieving gender equality in education.

Keywords: gender equality, education, gender stereotypes, reflective coeducation, teacher training

INTRODUCTION

Despite formally equal educational opportunities for women and men, there are still massive gender differences in students' academic motivation and achievement that flow into gender-typed educational and occupational aspirations (Kollmayer et al., 2018a). Women are still underrepresented in science, technology, engineering, and mathematics (STEM) while men are underrepresented in health and other socially oriented sectors (Boniol et al., 2019; European Commission, 2019). This underrepresentation starts at school where girls report lower academic self-concepts in STEM subjects than boys even after achievement is controlled for while the same is true for boys' self-concepts in reading and languages (Wigfield et al., 2002; Meece et al., 2006). In general, gender differences in motivation and achievement tend to be small in early childhood and the first school years but become increasingly apparent in adolescence (Evans et al., 2002; Hyde, 2005). Moreover, gender differences vary depending on the context of their investigation (Hyde, 2005) which indicates that socialization practices can minimize or exaggerate genuine gender differences.

Expectancy-value theory is one of the most influential theories for explaining human motivation and achievement. The theory postulates that an individual's achievement and achievement-related choices can be explained by their expectations about how well they will do on a certain activity and the extent to which they value the activity (Wigfield and Eccles, 2000). Drawing on this, gender differences in expectations for success and values of certain tasks and domains were found to be related to gender stereotypes conveyed by parents and teachers (Jussim et al., 1996; Wang and Degol, 2013). Gender stereotypes are culturally shared assumptions about the typical characteristics of women and men or girls and boys (Ashmore and Boca, 1979; Kite et al., 2008). Men and women are assumed to differ in terms of achievement-oriented traits labeled as agency, competence, instrumentality, and in terms of social- and service-oriented traits labeled as communion, warmth, or expressivity. These assumptions correspond to traditional gender roles that expect men to be strong, aggressive and assertive, and women to be nurturing, polite, and beautiful. Regarding educational domains, STEM subjects are gender-typed as masculine while languages are gender-typed as feminine (Ceci and Williams, 2007, 2010; Steffens and Jelenec, 2011).

Teachers are an important starting point for promoting gender equity at school as their gender stereotyped beliefs and educational practices were found to influence gender differences in students substantially (Gunderson et al., 2012; Heyder et al., 2020). Tiedemann (2000) found elementary teachers to think that average achieving girls were less talented than equally achieving boys. Moreover, teachers were found to attribute girls' unexpected failure more to low ability and less to lack of effort than boys' unexpected failure (Fennema et al., 1990). Regarding classroom interactions, boys were found to receive more praise and critical feedback from teachers and to be given more time to talk in classrooms than girls (Sadker et al., 1991). Therefore, it is not surprising that teachers' gender stereotypes relate to their students' academic self-concepts. For example, boys have

lower academic self-concepts and performance in reading if their teachers have gender stereotypical expectations regarding reading skills (Retelsdorf et al., 2015; Wolter et al., 2015; Muntoni and Retelsdorf, 2018). Similar relationships have been found between teachers' gender stereotypes and girls' academic self-concept and performance in mathematics (Tiedemann, 2000; Steinmayr et al., 2019). In addition, teachers' gender stereotypes seem to impact their students' educational careers through transitional recommendations. Teachers with more pronounced gender stereotypes tend to recommend boys to mathematics and science-oriented secondary schools and girls to language-oriented schools (Nürnberger et al., 2016) which sets the course for gender-stereotyped career choices.

In summary, teachers seem to lack effective strategies to counteract the often-unwanted maintenance of gender stereotypes in their teaching as this topic is rarely dealt with in regular teacher training (Gray and Leith, 2004). Most interventions to reduce gender stereotypes in schools directly target students (Lamb et al., 2009; Brinkman et al., 2011) and focus exclusively on the promotion of girls in STEM subjects (Good et al., 2003; Zhao et al., 2018). However, training programs for teachers who work with hundreds of pupils in their professional lives and can thus act as multipliers are significantly more sustainable. Interestingly, Lüftenegger et al. (2012) found gender differences in motivation to decrease when teachers fostered aspects of individualization and autonomy in their classrooms. Teachers who choose to promote autonomy and individualization in their teaching seem to be less guided by unconscious gender stereotypes, but more mindful to their students' individual talents and needs. Concerning concrete classroom activities, promoting autonomy and individualization means to give each student the opportunity to choose tasks or learning settings that fit their interests and abilities. This fosters a positive motivational climate in which diversity is a normal phenomenon that a teacher is aware of, cares about and knows strategies for dealing with. In general, motivational support is seen as a central means of reducing gender differences at school (Lubinski et al., 2000; Ziegler et al., 2006).

PEDAGOGICAL FRAMEWORK AND PRINCIPLES OF REFLECT

The training program REFLECT aims at promoting secondary school teachers' competences for reflective coeducation (Faulstich-Wieland, 1994) by teaching them to design tuition in a way that enables girls and boys to develop their interests and competences together without being restricted by gender stereotypes (Finsterwald et al., 2014). The basic idea of reflective coeducation is that mixed-sex schooling can only be successful if teachers permanently reflect on their own gender stereotypes, examine whether their attitudes, and teaching practices stabilize existing gender relations and further develop their teaching competences (Horstkemper and Faulstich-Wieland, 1996). Thus, the training program REFLECT focuses on how teachers can succeed in promoting individual motivation and achievement in all students without being restricted by gender stereotypes.

REFLECT is theoretically based on the actiotope model that explains human actions based on system theory (Ziegler et al., 2006, 2011) see **Figure 1**. An individual's actiotope consists of four interacting components: environment, goals, action repertoire, and subjective action space. The *environment* represents the material and symbolic framework for an individual's goal-oriented actions. The *action repertoire* includes all actions an individual is theoretically capable of performing, and the action repertoire actually used by an individual is designated as his/her *current action repertoire*. A person's *subjective action space* contains all behavior he/she perceives as feasible for himself/herself. Thus, according to the actiotope model, the process of transforming the current situation into a desired future state is regulated by the individual's *action repertoire*, *subjective action space* and the behavior options given in a specific *environment*. A teacher's *environment* is constituted by the students, the school's equipment, the colleagues and the headmaster. A teacher's current action repertoire includes his or her professional knowledge and set of actually applied teaching methods. Teachers' assumptions about the variability of gender differences as well as their self-efficacy beliefs to make a difference through teaching constitute their subjective action space.

In the training program REFLECT, four didactic principles were systematically applied: (1) *Promoting the acquisition of various types of knowledge*, namely declarative, procedural, contextual, and metacognitive knowledge (De Jong and Ferguson-Hessler, 1996). Teachers are guided to reflect on their own implicit assumptions and to come up with concrete applications of the training contents in their daily work life. (2) *Designing the training modules according to principles of instructional psychology* that have been shown to be effective in teacher trainings (Schober et al., 2007; Finsterwald et al., 2013; Lüftenegger et al., 2016). Every module contains teaching steps to attract attention, inform the participants about the learning goals, activate prior knowledge, illustrate the significance of the learning contents, offer guidance while learning, and secure

retention and transfer (Klauer, 1985). (3) *Ensuring transfer* following the anchored instruction approach (Bransford et al., 1990). Teachers work with authentic learning situations and are encouraged to test the training contents in their lessons. In each module, time is reserved for the teachers to exchange their experiences and discuss difficulties. Moreover, the second phase of the training is dedicated to transferring the training contents into teachers' classrooms. (4) *Imparting the learning contents explicitly and implicitly*. During the training, the teachers explicitly learn how to foster individualization and autonomy in their classrooms while the trainers themselves apply these teaching methods for implicit mediation.

LEARNING ENVIRONMENT, OBJECTIVES AND PEDAGOGICAL FORMAT

REFLECT focuses on teachers' actiotope for promoting gender equality in their classrooms by realizing the principles of reflective coeducation. Therefore, teachers learn about scientific findings on the emergence and maintenance of gender differences in academic motivation, achievement and aspirations, and about possibilities to reduce these gender differences through appropriate teaching methods in order to expand their current action repertoires. As teachers will only apply the acquired knowledge if they are convinced that they can implement it, their subjective action space is enlarged in the training through practical exercises and the supervised implementation of a classroom project. Teachers' environment flows into REFLECT as the teachers test all training contents in the classroom and discuss their experiences in the training. Moreover, the training addresses the role of language, textbooks, colleagues, and students' parents as relevant aspects of their environment. Although REFLECT is a teacher training program, it also aims at students. The intended changes in teachers' actiotopes are assumed to lead to changes in their teaching which in turn should lead to changes in their students. Therefore, REFLECT has three interrelated training goals: (1) Expanding secondary school teachers' current action repertoire by providing them with the knowledge necessary to change their teaching according to the principles of reflective coeducation; (2) Expanding teachers' subjective action space by enhancing their self-efficacy beliefs regarding reflective coeducation; (3) Increasing students' knowledge about the emergence of gender differences and improving their perception of diversity fairness in class.

The training program is conducted within the framework of a two-semester course. It is divided into two consecutive phases, an intensive phase followed by a supervision phase. For the participating teachers REFLECT embraces a work effort of 100 h per phase. In the intensive phase, teachers attend four modules of 2 days (à 7 h) in a university setting (56 h). In the remaining 44 h of this phase, participants work with the training contents in preparation and follow-up processing between the modules. In the second semester during the supervision phase, teachers integrate the contents of the training into their teaching with the support of the trainers that is

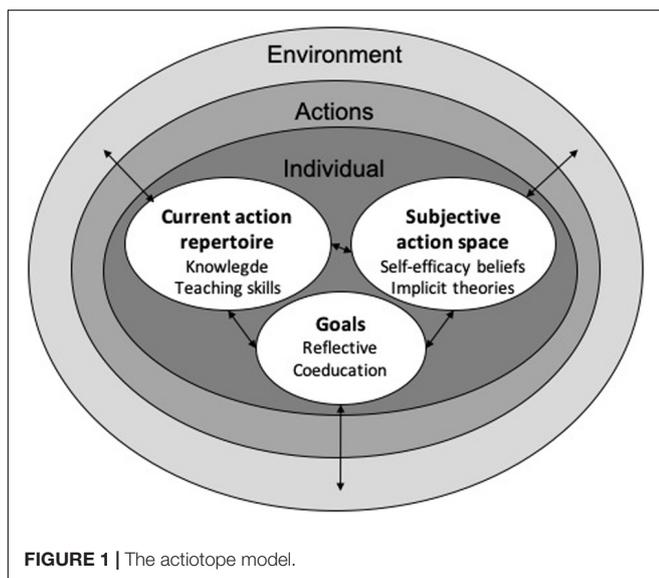
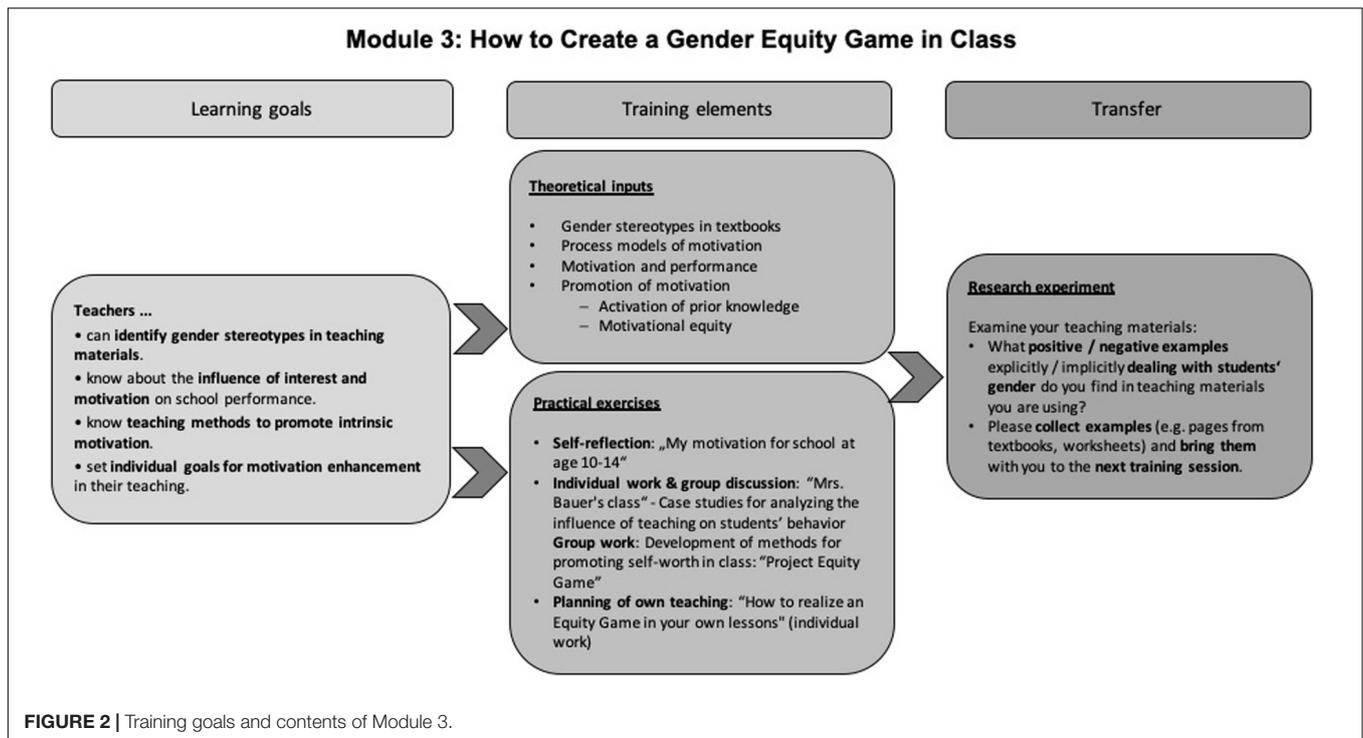


FIGURE 1 | The actiotope model.



fading in accordance with the cognitive apprenticeship method (Collins et al., 1989). Training contents in the intensive phase cover an introduction to the topic of reflective coeducation (Module 1), psychological findings regarding gender differences in education (Module 2), and concrete teaching methods to reduce gender differences in the classroom (Modules 3 and 4). In the first module, the participating teachers get to know different psychological approaches to the topic of promoting gender equity in schools including the comparison of single-sex education and reflective coeducation. In addition, they are guided in reflecting on their own gender stereotypes, which is an important prerequisite for reflective coeducation. The second module deals with the development of gender differences emphasizing the nature versus nurture debate (Eagly and Wood, 2013). The main focus of the module is on the contribution of gender stereotyped socialization practices to gender development and differentiation (Bussey and Bandura, 1999). Among others, the module emphasizes the influence of parents, teachers, media, and language use (Kollmayer et al., 2018b). Based on this, teachers are guided to reflect on their impact on the emergence of gender differences among their students. In the third module, teachers learn to identify aspects of their teaching that can lead to the development of gender-typed academic motivation, achievement and aspirations in their students, and about ways of promoting gender equity in the classroom, for example by selecting adequate teaching materials or assigning tasks differently. The module especially focuses on how to create a climate of motivational equity, in which students are motivated to learn primarily for intrinsic reasons (Covington, 1998). Building on that, teachers are guided in designing lessons that foster individualization and autonomy and thus reduce the impact of gender stereotypes on

motivation and achievement (Lüftenegger et al., 2012). **Figure 2** highlights how the different elements of the training (theoretical input, practical exercises, and research experiments) interact to support the teachers in reaching the learning goals of the third module as an example for the general structure of the training. In the fourth module, REFLECT deals with the importance of attributions, i.e., assigning causes to success and failure for academic motivation and achievement (Weiner, 1985). Teachers learn about typical gender differences in attributions for academic success and failure and about related feedback behavior of teachers (Fennema et al., 1990; Sadker et al., 1991). They practice how to give students attributional feedback that strengthens their individual motivation regardless of their gender. In addition, options for implementing reflective coeducation at the school level are discussed, e.g., representing this principle in conversation with headmasters, colleagues, and parents.

The intensive phase of REFLECT is followed by a supervision phase to ensure that the teachers integrate the training contents into their daily work routines. In this phase, the teachers are supervised in developing and conducting individual class projects dealing with the topic of “Gender and Occupation,” as gender differences in secondary school students often flow into gender-typed career choices (OECD, 2012). Teachers are encouraged to design their class projects to suit the subjects they usually teach. Each teacher is bound to spend at least 10 lessons for at least 5 weeks on the class project, since programs were found to have significant effects only after a longer implementation phase (Lipowsky and Rzejak, 2012). The class projects include teaching students about the fact that girls and boys do not systematically differ in their aptitudes for different occupations, reflecting on reasons for differences in career choices, and discussing society’s

gender (in)equality. The teachers are supported in designing the class projects in line with the teaching methods they get to know in the intensive phase.

EVALUATION RESULTS

In a pilot study with 38 teachers who participated in REFLECT and their 564 students, the effectivity of the training program was systematically evaluated. The evaluation was carried out by means of a training-control-group design with a multi-method, multi-informant approach using pre- and posttest data. Teachers and students completed different quantitative (knowledge tests; questionnaires with closed answer format) and qualitative instruments (research logbook, portfolios). Both the training group and the control group were surveyed at the beginning and shortly after completion of the project with self-report online questionnaires. Detailed information about the data collection, methods, and results of the evaluation of the training program can be found in two original research articles dealing exclusively with the evaluation of REFLECT – Kollmayer et al. (2019) for teachers and Schultes et al. (2015) for students.

As indicators for *teachers' current action repertoire*, we assessed their knowledge of gender differences in education using multiple choice questions as well as their use of teaching methods promoting autonomy (Jerusalem et al., 2009). The multiple-choice questions were analyzed in a way that minimized the probability of guessing the right result (Kubinger, 2014). One point was awarded if a question was answered completely correct (i.e., if all correct alternatives and no false alternatives were selected), in any other case, zero points were awarded. As

indicators for *teachers' subjective action space*, their self-efficacy for motivation enhancement (Bandura, 1997) as well as their implicit theories about gender differences (Dweck et al., 1995) were assessed. In addition, the online questionnaire contained questions regarding teachers' demographic characteristics (e.g., gender, age, years of service) and a shortened form of the modern sexism scale (Eckes and Six-Materna, 1998). The teachers answered all questions on sliders with a marked middle from 0 (not at all convinced) to 100 (fully convinced). Sample items and reliabilities of the scales are shown in **Table 1**.

The 38 teachers of the training group were matched with 76 teachers of the control group (consisting of 121 teachers in total) using propensity score matching (Lee and Little, 2017). In quasi-experimental intervention designs, propensity score matching minimizes effects caused by non-controllable confounding variables. In order to determine relevant matching criteria, we analyzed differences between the two groups at the first measurement point. We detected significant differences between the training group and the control group regarding teachers' sexist attitudes (Eckes and Six-Materna, 1998) and regarding the extent to which teachers already promoted autonomy in their classrooms, indicating that teachers who participated in the training program REFLECT were less sexist and promoted autonomy to a greater extent than their colleagues who did not participate in REFLECT. To account for these differences, we matched participants of the two groups according to similarity in these variables, as well as their proximity in gender and age. The results of the evaluation show the effectiveness of the training program REFLECT (Kollmayer et al., 2019). In comparison to the control group, REFLECT teachers' current action repertoire and subjective action space showed a stronger increase. More

TABLE 1 | Sample items and reliabilities of the questionnaires used in the evaluation of REFLECT.

Target group	Scale	Sample item	Number of items	Cronbach's alpha	
				Pretest	Posttest
Teachers	Teaching self-efficacy (adapted from Bandura, 1997)	To what extent can you ensure that your students believe they can be good at school?	4	0.80	0.86
	Implicit theories about gender differences (adapted from Dweck et al., 1995)	Gender differences in performance cannot be changed.	3	0.80	0.80
	Use of teaching methods promoting autonomy (Jerusalem et al., 2009)	In my class, the students can choose from various topics.	5	0.79	0.88
	Knowledge of gender differences (self-constructed)	When they have the same school performance; (a) male students show a tendency to overestimate their performance. (true); (b) female students show a tendency to underestimate their performance. (true); (c) male students show a tendency to underestimate their performance. (false); (d) female students show a tendency to overestimate their performance. (false)	9	–	–
	Modern Sexism (Eckes and Six-Materna, 1998)	It is rare to see women treated in a sexist manner on television.	6	0.80	0.76
Students	Perception of diversity fairness in the classroom (Schober et al., 2007)	In our class those girls who do not behave like "typical girls" are also popular.	7	0.64	0.72
	Ratings of intervention fidelity (Rakoczy et al., 2008)	In the project, I could choose between different tasks.	14	–	0.80
	Knowledge of gender issues (self-constructed)	In Austria men are allowed to work as kindergarten teachers (true).	9	–	–

concretely, over the duration of the training program, trained teachers showed a higher increase in their knowledge about gender differences in education and also a higher increase in promoting students' autonomy in the classroom (= current action repertoire). Moreover, regarding teachers' subjective action space, REFLECT led to a higher increase in teachers' self-efficacy beliefs for enhancing students' motivation and to a stronger decrease in teachers' beliefs that gender differences are unchangeable.

The effectiveness of REFLECT on the part of the students was analyzed in combination with the teachers' fidelity in implementing their class projects during the supervision phase (for details, see Schultes et al., 2015). Teachers had documented their class projects in portfolios, which were rated by two independent experts concerning intervention fidelity to the didactic principles of reflective coeducation. Participating students ($N = 564$) were surveyed on their knowledge about gender issues using single-choice questions (wrong/false) and on their perception of diversity fairness in the classroom (Schober et al., 2007) at a pre- and posttest. Moreover, they also rated the intervention fidelity of the class projects (Rakoczy et al., 2008). Changes in outcome variables were tested using latent change modeling, and experts' and students' ratings of intervention fidelity were linked to outcomes in students using hierarchical linear modeling. The results showed that the students' knowledge about gender issues increased during the program. When the teachers had implemented the class projects as intended, there was also an increase in students' perception of diversity fairness in the classroom. Sample items and reliabilities of the scales are shown in **Table 1**.

DISCUSSION

The training program REFLECT focuses on imparting reflective coeducation in secondary schools, where students' gender-typed academic motivation and occupational aspirations develop under the influence of teachers. Reflective coeducation requires teachers to reflect on their own gender stereotypes, to examine whether their teaching is influenced by gender stereotypes, and to develop their teaching competences (Faulstich-Wieland, 1994). Training teachers is very sustainable as each teacher works with hundreds of students in his/her professional life. The results of the pilot study show that REFLECT not only made teachers see gender differences as less unchangeable, but also gave them confidence for promoting their students' motivation regardless of their gender. Moreover, REFLECT led to an increase in knowledge about gender differences in education and in the use of teaching methods to promote autonomy and individualization. Both aspects are central to reflective coeducation. Only teachers who know how to counteract existing gender stereotypes in their teaching and also believe that they are capable of changing gender differences will promote change.

Of course, secondary schools are not the only educational context where gender stereotypes are maintained. Interventions to promote gender equality must consider the peculiarities of different stages of human development and educational contexts. While students' academic motivation and occupational decisions

are especially relevant topics to deal with for secondary school teachers, teachers in preschools have to focus on other topics for realizing reflective coeducation. Preschool teachers were found to project gender stereotypes about play onto their students (Lynch, 2015) which can result in gender-typed toy preferences in children. Gender-typed toy play in turn leads to the promotion of gender-typed skills, with girls practicing communal roles and boys practicing agentic roles (Li and Wong, 2016). Therefore, we also developed a training program for preschool teachers, in which they learn about children's gender development and differentiation, mechanisms and materials that perpetuate gender stereotypes in preschool settings, and how to create a less stereotypical environment that enables a greater range of interests and behaviors in children (Kollmayer et al., 2018c).

The pilot study showed that teachers voluntarily participating in REFLECT were less sexist and had already applied better teaching methods than the average teacher in the control group. Therefore, implementing reflective coeducation in general teacher education could contribute to achieving gender equity in education even more than training programs that reach primarily teachers who are already sensitized to issues of gender equality. However, transferring insights from research to policy and society is not trivial (Schober et al., 2016). Spiel et al. (2018) propose a six-step procedure for implementing intervention research into public policy, that includes mission-driven problem recognition, ensuring availability of robust scientific knowledge, identification of reasonable starting points for action, establishment of a cooperation process with policymakers, coordinated development of intervention, and transfer of program implementation. Following these steps, the REFLECT program was developed with the support of five Austrian federal ministries. However, even after successful piloting, the contents of the training program were not implemented in general teacher education. This shows the challenges involved in linking the systems of politics and science that still have to be overcome.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

MF, BS, and CS developed the training program. MK and M-TS prepared the draft manuscript. MF, ML, and CS provided critical revisions. All authors contributed meaningfully

to the manuscript and approved the final version of the manuscript for submission.

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Mindfulness and Empathy: Mediating Factors and Gender Differences in a Spanish Sample

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Numerous research studies link mindfulness training to improved empathy. However, few studies focus on the mediating factors of empathy. This work has three objectives: (a) to analyze the possible mediation of mindfulness as a feature in this relation, (b) to analyze the mindfulness factors that mediate in the increase of empathy and (c) to analyze the moderating role of gender. The sample was composed of 246 Spanish-speaking university students ($M = 24.08$ years, $SD = 8.43$). The instruments used were the Five Facet Mindfulness Questionnaire (FFMQ) and the Toronto Empathy Questionnaire (TEQ). For data analysis, the indirect effect was calculated using 10000 bootstrap samples for the bias-corrected bootstrap confidence intervals (BCI). The improvement of empathy is mediated by the changes in mindfulness trait ($B = 0.233$, $p < 0.001$), disappearing in the presence of this mediator, the direct effect of mindfulness practice on empathy ($B = 0.161$, $p = 0.394$). We did not find a differential functioning of this mediation according to gender. *Observing* and *describing* are the FFMQ factors that mediate significantly between mindfulness practice and empathy.

Keywords: mindfulness, empathy, mediating effect, gender, FFMQ, TEQ

INTRODUCTION

Mindfulness has experienced a boom in recent years with interventions that have proven effective in different contexts and ages (Coholic and Eys, 2015; Ted Ng et al., 2016; Zeng et al., 2017). Health-related areas are those, either as a complementary therapy to treatment or as an improvement in general well-being, on which the main research in this field has been focused, for example, the importance of a normalizing, accepting, non-judgmental attitude to decrease anxiety and depression, and to foster wellbeing, reduce stigma and prejudice (Barcaccia et al., 2019; Salvati et al., 2019).

However, in recent years its practice has extended to other areas such as organization, schools and sports (De Allicon, 2020; Vickery and Dorjee, 2016; Doron et al., 2020; Emerson et al., 2020).

Viciano et al. (2018) in their review of scientific production in mindfulness for the decade 2007–2017 in the Web of Science, report a rather scarce production with respect to studies that focus on mindfulness within the university environment. They point out that, of the total of 652 articles in any language, only 96 would be related to the field of education. The research on mindfulness in the university environment is reduced to 24 articles, with a total sample of 4119 students.

The main results in the university population point to its effectiveness in promoting health, general well-being, increased life satisfaction and a decrease in states of anxiety and

depression (Dvorakova et al., 2017). Benefits have also been noted in knowledge retention (Ramsburg and Youmans, 2014), and significant improvements in reading and science scores (Bakosh et al., 2016).

Mindfulness is defined as focusing attention in an intentional way on the present moment without judging (Kabat-Zinn, 1990). It has been conceptualized as having several elements such as acceptance, non-judging, and non-reactivity. This multi-faceted conceptualization of mindfulness allows for a more complete understanding of its relationships with other variables, and thus Baer et al. (2006) developed the Five Facet Mindfulness Questionnaire (*FFMQ*) that provides the most comprehensive coverage of the construct (Peters et al., 2015). The *FFMQ* arises from the exploratory factor analysis of the five most popular questionnaires that had been developed on mindfulness (Baer et al., 2006). It provides a broader assessment of mindfulness in its attentional, self-awareness and emotional regulation facets compared to other popular scales such as the *MAAS*, which evaluates only the component of mindfulness focused on the present by a single factor (Zhuang et al., 2017). In addition, it has demonstrated sensitivity to differences in mindfulness practice, allowing for discrimination between meditators and non-meditators (Cebolla et al., 2012). It consists of five dimensions: *observing* - the ability to perceive and recognize internal or external stimuli -, *describing* - to label with words the living experience -, *act with awareness, not-judging of inner experience* - equable vision before the thoughts, sensations or emotions that are perceived - and *not-reactivity to inner experience* - the latter refers to the distance with the experience and a period of time in which one does not react to the stimulus (Baer et al., 2006).

On an emotional level, mindfulness facilitates the development of a feeling of unconditional love, compassion and forgiveness toward ourselves and others (Gilbert, 2010; Neff, 2011; Siegel, 2007). With respect to oneself, self-compassion allows us to understand our own suffering from a broad and transcendent perspective, perceiving human imperfections and feeling empathy toward others (Wu et al., 2019). With respect to others, compassion would turn the suffering of others into a vehicle for connection, rather than isolation (Salzberg, 2011). McCullough et al. (1997) highlight the emotional dimension of empathy as the most important in the development of forgiveness toward others. This affective disposition creates a bond on which empathy is constructed, since it helps us to perceive our shared humanity. Worthington (2006) in his model REACH on forgiveness to others raises empathy as the core of the model, facilitating a positive emotional response and compassion toward a person or an event that hurt us. Thus, empathy seems to play a key role in forgiveness and compassion toward oneself and others, allowing the maintenance, reconciliation and repair of social relationships.

This paper aims to deepen the mechanisms through which the practice of mindfulness could foster our empathic ability. Empathy refers to the ability to be affected by and share the emotional state of another, to evaluate the reasons for the other's state and to identify with the other, adopting their perspective (De Waal, 2008). It is an essential component of

social cognition, contributing to and enhancing our ability to understand, respond to and adapt to the emotions of others, to be effective in emotional communication and to engage in prosocial behavior (Spreng et al., 2009). While there has been an evolution in definitions according to different approaches and perspectives, research emphasizes the distinction between cognitive and emotional components (Rankin et al., 2005). Nevertheless, it has been difficult to find consensus between the theoreticians and investigators about if the processes that are related to empathy – perspective taking, sympathy, personal anguish, emotional contagion or theory of mind – are part of an affective perception or a cognitive understanding (Spreng et al., 2009). Thus, it is evidenced a great difficulty in finding agreement on the interrelated processes that contribute to empathy. In this work we have conceptualized empathy as an emotional process mainly, not subordinated to a cognitive understanding, although this can help to improve understanding and behavior (Spreng et al., 2009).

Different studies on empathy seem to indicate that we are born with a biological predisposition to be empathic; nevertheless, its level of development is influenced and determined by the environment. To increase empathy in people would be a great benefit for society with respect to the diminution of antisocial behaviors (Winning and Boag, 2015). In this sense, to advance toward a society of solidarity and understanding it would be key to foster empathy.

Some research related to empathy suggests contradictory results regarding the influence of gender. The initial studies that examined these differences (Hoffman, 1977) show higher levels of empathy in women. Hoffman suggests that women have a greater tendency to put themselves in the place of the other, as well as a greater emotional resonance. Eisenberg and Lennon (1983) in an attempt to replicate these results found that women obtained higher scores when empathy was assessed through a questionnaire, but found no differences when physiological correlates or facial gestures were measured. This led to the assumption that the differences between men and women were due to gender role stereotypes, according to which when completing the questionnaires women tended to present themselves as more empathetic because this is what is expected of them regardless of the fact that there are no differences in reactivity. Later research supports these conclusions: Michalska et al. (2013) found that women scored higher than men on an empathy questionnaire, a difference that increased with age. However, they found no gender differences in pupillary reaction or neural or hemodynamic response, suggesting dissociation between the questionnaires and neurophysiological response. Recent studies have found gender differences in the influence of mindfulness on other constructs such as aggression or rumination (Peters et al., 2015; Eisenlohr-Moul et al., 2016) so the role of gender as a moderator in the effects of mindfulness on empathy will be explored. In recent years, mindfulness-based interventions have been proposed as a means to improve empathy responses (Fulton and Cashwell, 2015; Kemper and Khirallah, 2015; Foukal et al., 2016; Lamothe et al., 2016; Bellosta-Batalla et al., 2017). Empathy involves the ability to understand and share the feelings of others. Thus, the basic attentional

processes involved in mindfulness (*observing, describing and acting with awareness*) could be key in the development of empathy. The capacity to be aware of what is happening in the present moment, and to *observe* and *describe* the emotions in oneself, would make the appearance of these capacities more likely in relationships with others. Jinpa et al. (2009) propose that people would be able to observe and describe their own suffering and would become aware of their desire to alleviate it, extending it to the suffering of others in a natural way. Also, the capacities of *non reactivity* and *non judging*, can be key in the empathic development since they would allow to distance themselves from the strong emotions when not reacting in excess, making possible to understand, to take care of and to respond properly to the other's feelings (Wallmark et al., 2012). In this line, Bishop et al. (2004) raises mindfulness as a metacognitive capacity that orients people not only to their own affective state, but also to contextual stimuli in a non-reactive and acceptance way. Moreover, from a physiological point of view, it has been established that the practice of mindfulness causes changes in the same brain areas that are related to empathy: the prefrontal cortex, the anterior cingulate cortex and the anterior insula (Cahn and Polich, 2006; Lutz et al., 2008; Chiesa and Serretti, 2010; Shamay-Tsoory, 2011). Hölzel et al. (2011) found that the daily practice of 30 min of meditation increased the density of gray matter in the brain regions associated with empathy. Numerous studies have found this benefit (Greason and Cashwell, 2009; Birnie et al., 2010; De la Fuente-Anuncibay et al., 2019; Ngô, 2013; Shapiro et al., 1998). Nevertheless, several studies question this positive effect in the improvement of empathy when practicing mindfulness (Beddoe and Murphy, 2004; Dekeyser et al., 2008; Ridderinkhof et al., 2017).

Although there are many aspects to investigate (Fulton and Cashwell, 2015; Bibeau et al., 2016), there are theoretical as well as empirical evidences that support the connection between mindfulness and empathy (Jones et al., 2019). Most of studies explain this relation from correlations or regressions (Krasner et al., 2009; Fulton and Cashwell, 2015) being the therapeutic contexts, associated to health variables, and development of empathy skills in health professionals those who have centered the greater efforts (Aiken, 2006; Miró et al., 2015; Wang, 2006).

The popularization of mindfulness practice has increased in non-formal settings, but there is little research that attempts to explain the mechanisms through which mindfulness practice influences empathy outside of closed or structured programs (Barbosa et al., 2013; Jones et al., 2019), or the differential effects based on gender.

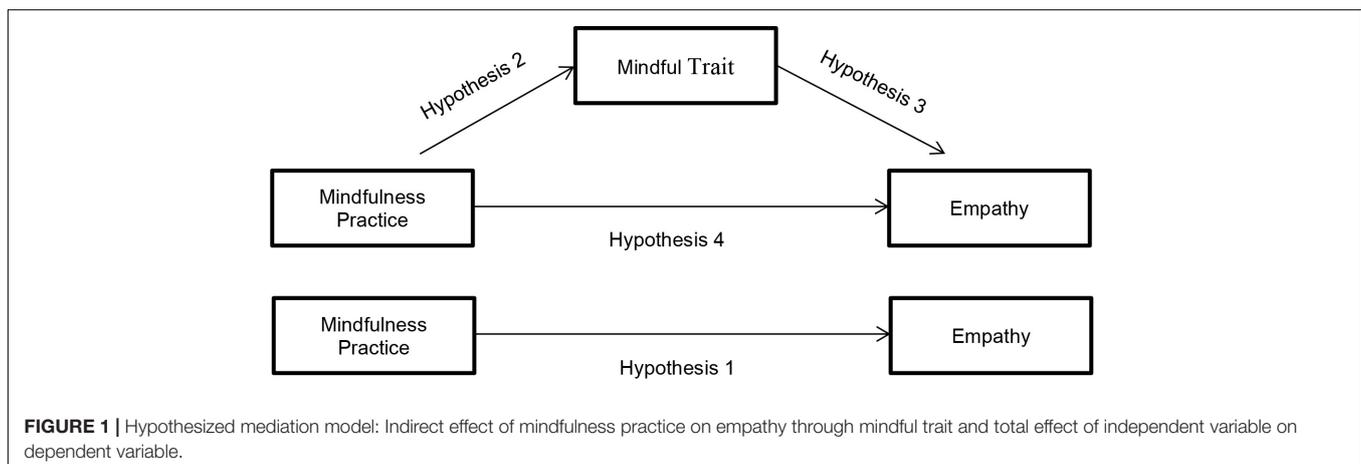
On the other hand, most of the research has been carried out in Anglo-Saxon areas. In this respect, De la Fuente-Anuncibay et al. (2019) in their study with English students, pointed out modifications in the mindfulness trait and their influence in the development of empathy, pointing out the necessity to extend it to samples of other countries, although we do not have evidences of this type in other contexts like the Spanish-speaking one.

The present study addresses the practice in an informal or non-therapeutic context (leisure, meditation centers, courses, etc.), which has been little studied previously, and focused on university students in Spain. The objectives set in this study focus on verifying that mindfulness practices produce changes in the cognitions of the mindfulness construct, which are those that influence the improvement of empathy.

As illustrated in **Figure 1**, the total effect (c) refers to the relationship between mindfulness practice and empathy without controlling for the mediator (Hypothesis 1). The direct effect (c') refers to the relationship between mindfulness practice and empathy after controlling for the mediator (Hypothesis 4). Finally, a total indirect effect (ab) refers to the role of the mediator in the relationship between mindfulness practice and empathy (Hypothesis 2 and 3).

The second objective will be to establish which are the factors of mindfulness trait that have more influence on the development of empathy in Spanish-speaking contexts. Mindfulness is a metacognitive factor that precedes other cognitive-affective processes, so we consider that it can function as a mediator and that the five facets of mindfulness could be influencing the increase of empathy skills. Thus, we expect to obtain similar results to the study by De la Fuente-Anuncibay et al. (2019) in English-speaking samples, in which *observing, describing, and not-reactivity* were predictors of empathy (Hypothesis 5).

As a third objective, because previous work has demonstrated gender differences in empathy (Michalska et al., 2013) and gender



differences in the effects of mindfulness on other variables such as aggressiveness (Eisenlohr-Moul et al., 2016) we also explored gender as a moderator of the effects of mindfulness on the empathy (Hypothesis 6).

MATERIALS AND METHODS

Participants

An convenience sample of 246 volunteer students from the University of Burgos (Spain) belonging to 7 degrees was selected: Degree in Social Education ($n = 80$), Degree in Pedagogy ($n = 102$), Degree in Early Childhood Education Teacher ($n = 25$), Master's Degree in Inclusive Education and Society ($n = 18$), Course on Pedagogical and Didactic Qualification in Vocational Training ($n = 15$), and Master's Degree in Teacher Training in Compulsory Secondary and Upper Secondary School Education ($n = 6$). The gender distribution was 35 men and 211 women with an average age of 22.23 years ($SD = 4.76$). The distribution of the sample presents a representative percentage of the university population in the area studied, characterized by a greater presence of women. In this sense, the OECD (2016) points out great differences according to the areas, greater in education (81%) with respect to health or social services (72%), these percentages being very similar to other European countries such as Ireland and the United Kingdom. The sampling was non-probabilistic convenience.

With regard to the practice of mindfulness, it was included in the group of people who practiced or had practiced mindfulness for non-therapeutic purposes in the last three years. The sample was divided into two groups according their responses to the question "Have you had any mindfulness training?", separating those who had never practiced mindfulness and those who had practiced it in informal contexts, that is, outside closed programs with a predetermined number of sessions.

Instruments

The scales used were the Five Facet Mindfulness Questionnaire (*FFMQ*) (Baer et al., 2006) and the Toronto Empathy Questionnaire (*TEQ*) (Spreng et al., 2009) selected for presenting adequate psychometric characteristics. The *FFMQ* was designed to measure mindfulness with psychometric guarantees from a factor analysis of the five most used scales that measured mindfulness trait, or the tendency to be more aware in daily life, consolidating a new 39-item questionnaire. It consists of five subscales: *observing*, *describing*, *act with awareness*, *not-judging of inner experience* and *not-reactivity to inner experience* (Baer et al., 2006). These are grouped into a general factor of second order that collects mindfulness cognitions in a single dimension. It has psychometric guarantees, adequate reliability, convergent and discriminatory validity, showing sensitivity to differences in the practice of mindfulness (Cebolla et al., 2012). Cronbach's alpha was 0.888 for the *FFMQ* (*observing* = 0.803, *describing* = 0.926, *act with awareness* = 0.846, *not-judging of inner experience* = 0.861 and *not-reactivity to inner experience* = 0.640).

The *FFMQ* has been validated in many countries, including France, the Netherlands, Germany, China, Norway and Chile (Rodríguez, 2017).

The *TEQ* (Spreng et al., 2009) is a short questionnaire that measures empathy as a primary emotional process, as a broad construct. It is a reliable scale (Cronbach's alpha = 0.69) robust, with internal consistency and test-retest reliability (Spreng et al., 2009). By means of a factorial analysis from the most used questionnaires to evaluate empathy, Spreng et al. (2009) obtained a one-dimensional factor that contemplates 16 items with contents on empathy such as emotional contagion and responses to the emotional state of the other or of help, altruism or activation of the sympathetic system.

Both scales have been used in previous studies with similar college populations (Quezada et al., 2012; Schmidt and Vinet, 2015; Mathad et al., 2017).

Procedure

The data was collected by the research team on paper and participation was voluntary. The research was approved by the Bioethics Committee of the University of Burgos. The principles of anonymity and confidentiality of the data of the study participants were taken into account. To obtain information, students completed the questionnaires in a single phase of about 25–30 min.

RESULTS

Preliminary Analysis

Means, standard deviations, skewness and kurtosis values, and correlations for major study variables are summarized in **Table 1**. We checked skewness and kurtosis in our mediators and criterion variables. Following Curran et al. (1996), skewness $> \pm 2$ and kurtosis $> \pm 7$ would indicate non-normal distribution. The results indicated that all measures were normally distributions, except *non-reactivity to inner experience* (Kurtosis = 8.18) dimension. However, as show Ng and Lin (2016) in your simulation, unlike classic methods, bootstrap methods do not rely on the assumption of asymptotic normality of the parameter estimates and offer better results. Even with a small sample size, bootstrap methods offer satisfactory control over Type I error and desirable statistical power (Ng and Lin, 2016). Moreover, PROCESS provides a method for testing of indirect effects that minimizes bias in results that can arise from non-normal sampling distributions (Hayes, 2018).

As can be seen, empathy correlates positively with the mindfulness trait ($r = 0.249$, $p < 0.0001$). Of the dimensions of *FFMQ*, empathy was positively correlated with *Observing* ($r = 0.270$, $p < 0.0001$) and *Describing* ($r = 0.235$, $p < 0.0001$). The internal consistency indices (Cronbach's alpha) of all variables in the study range from 0.640 to 0.926.

Mediation Model

The first objective of this work is to confirm, from the total measurement of the mindfulness trait, the relationship between practicing mindfulness (in informal contexts) and improving

TABLE 1 | Means, Standard Deviations, and Intercorrelations.

	M	SD	S	K	1	2	3	4	5	6
1. FFMQ	3.25	0.46	0.34	0.37						
2. Observing	3.21	0.71	0.16	-0.09	0.526***					
3. Describing	3.35	0.86	-0.06	-0.76	0.791***	0.337***				
4. Acting with Awareness	3.16	0.66	-0.14	-0.15	0.558***	-0.012	0.287***			
5. Non-judging of Inner Experience	3.39	0.71	-0.02	-0.21	0.630***	-0.022	0.351***	0.401***		
6. Non-reactivity to Inner Experience	3.11	0.66	1.27	8.18	0.651***	0.352***	0.420***	0.133*	0.270***	
7. TEQ	4.09	0.36	-0.25	-0.39	0.249***	0.270***	0.235***	0.118	0.051	0.087

S = Skewness, K = Kurtosis. * $p < 0.05$, *** $p < 0.001$.

empathy. Our hypothesis is that, in the presence of the mindfulness trait mediator, the direct effect of mindfulness practice on the improvement of empathy disappears.

We carried out a mediation analysis with the macro PROCESS for SPSS (Model 4), developed by Hayes (2018) in order to address the hypotheses of this study (Hypothesis 1 to H4). Mediation analyses test the effect of X (mindfulness practice) on Y (empathy) through the mediating variables (mindfulness trait). In this sense, mediation analysis allows us to assess how mindfulness practices influence empathy.

In our case, PROCESS generates coefficients using ordinary least squares (OLS) regression. We performed the analysis with 10000 bootstrap samples, with which it is not necessary to satisfy the assumptions of OLS (normality, lack of multicollinearity, etc.).

Furthermore, this technique allows introducing dichotomous variables into the model (in this case, having or not practicing mindfulness), without the restrictions and disadvantages that others, such as Structural Equation Modeling - SEM-, through Weighted Least Squares (WLS) estimation present.

Applying this method, we generate 95% bias-corrected confidence intervals for indirect effects. Hayes and Preacher (2010) recommend the use of bootstrapping techniques to obtain confidence limits for indirect effects. Bootstrapping is a non-parametric sampling technique that resamples several times, improving the power of a model, to estimate the indirect effect. The Bootstrapping IC is the most recommended way to evaluate indirect effects (Preacher et al., 2007). The indirect effect is statistically significant if the intervals do not include zero.

The results showed significant total effects of mindfulness practice on empathy (Hypothesis 1: $\beta = 0.375$, $p = 0.043$). The total indirect effects (ab) were statistically significant, since the 95% confidence interval (CI) of the point estimate did not cross zero ($\beta = 0.214$, $\text{BootSE} = 0.085$, $\text{Boot95\% CI} = 0.074, 0.404$). So, there was a significant indirect pathway: the mindfulness practice was a significant predictor of mindfulness trait (Hypothesis 2: $\beta = 0.916$, $p < 0.0001$), which was itself a significant predictor of empathy (Hypothesis 3: $\beta = 0.233$, $p = 0.0002$). Considering the influence of the mediator, that is, considering this significant indirect route, the direct effect (c') of mindfulness practice on empathy was not significant (Hypothesis 4: $\beta = 0.161$, $p = 0.394$), according to our approach (Table 2).

TABLE 2 | Mediation model (PROCESS, Model 4).

	β	SE	p
Mediating variable model (DV: Mindful trait) Predictor			
Mindfulness practice (a)	0.916	3.189	0.0001
DV: Empathy Predictors			
Mindful trait (b)	0.233	0.020	0.0002
Mindfulness practice (c')	0.161	1.093	0.394
Total effect			
Mindfulness practice (c)	0.375	1.067	0.043
Indirect effect (ab)	B	BootSE	Boot 95% CI
Mindfulness practice → Mindful trait → Empathy	0.214	0.085	[0.074, 0.404]

Indirect effect of mindfulness practice of (X) on empathy (Y: TEQ) through changes in mindfulness trait (M: FFMQ). DV = dependent variable; CI = confidence interval.

As can be seen, all the hypotheses are confirmed as expected. Figure 2 shows the results of the mediation model, which indicate that the indirect effect is significant.

The second objective of the study is to analyze what mindfulness factors are mediating the overall effect between mindfulness practice and empathy.

The SPSS macro PROCESS, developed by Hayes (2018) was again used to check which FFMQ dimensions are mediating the relation between mindfulness practice and empathy (Figure 3). The indirect effect was also calculated using 10000 bootstrap samples for the bootstrap confidence intervals (CIs).

Table 3 shows the results of the indirect mediation routes for each of the mindfulness factors. These results indicated the indirect coefficient was significant ($B = 0.244$, $\text{BootSE} = 0.09$, $\text{Boot95\% CI} = 0.068, 0.448$).

Only the indirect effects of the *observe* and *describe* dimensions are significant. The factors *acting with awareness*, *not-judging of inner experience* and *non-reactivity to inner experience*, would not work as mediating variables in the relationship between the practice of mindfulness and empathy.

Analyzing the significant results, the indirect effects indicate that the practice of mindfulness was a significant predictor of *observation* ($B = 0.773$, $p < 0.001$) and this was a significant predictor of *empathy* ($B = 0.235$, $p < 0.001$).

Also, it has been found that the practice of mindfulness was a significant predictor of the ability to *describe* ($B = 0.611$, $p < 0.001$) and this in turn was a significant predictor of *empathy*

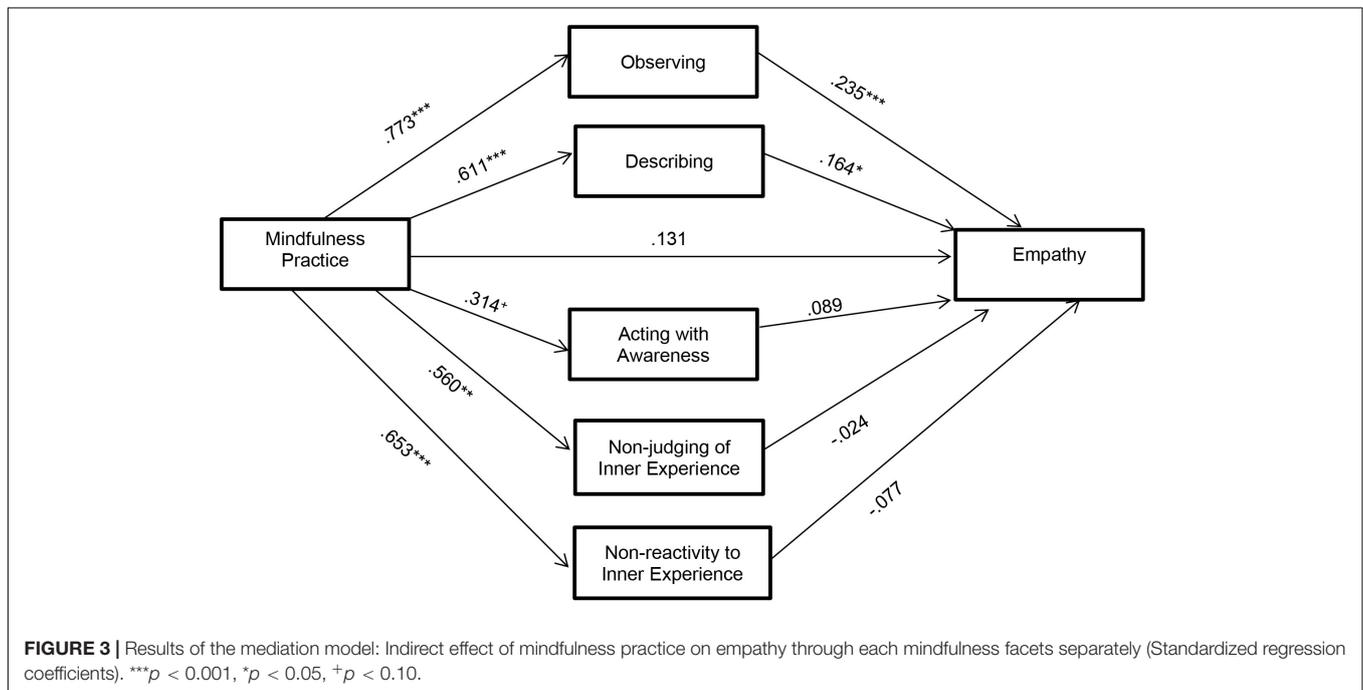
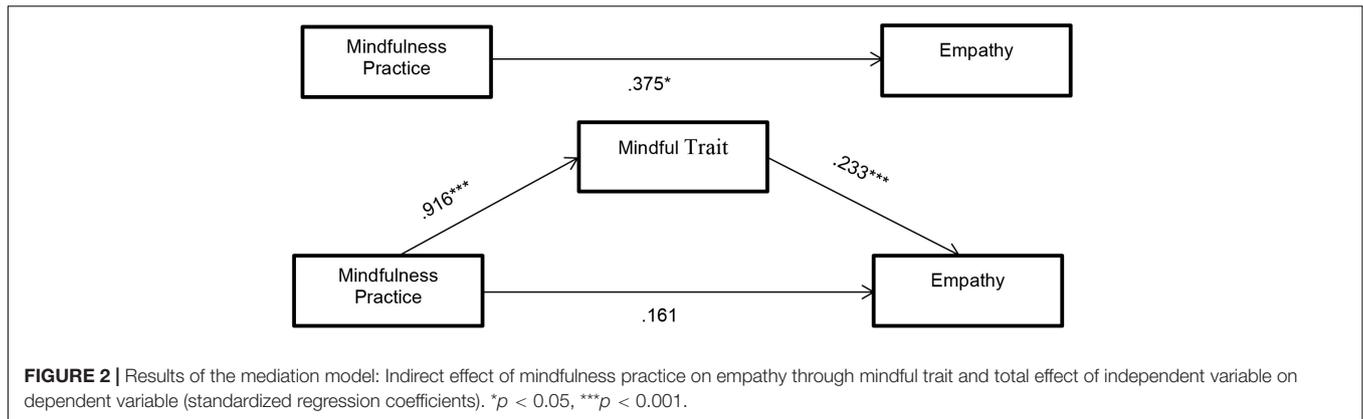


TABLE 3 | Mediation model.

Indirect effect	B	BootSE	Boot 95% CI
MP → Observing → Empathy	0.179	0.073	[0.056, 0.338]
MP → Describing → Empathy	0.100	0.054	[0.008, 0.217]
MP → Acting with awareness → Empathy	0.028	0.034	[-0.019, 0.112]
MP → Non-judging of inner experience → Empathy	-0.013	0.044	[-0.108, 0.072]
MP → Non-reactivity to inner experience → Empathy	-0.050	0.052	[-0.169, 0.038]

Indirect effect of mindfulness practice (X) on empathy (Y), presenting the mediating impact of each mindfulness facets (M). Partially standardized regression coefficients, MP = Mindfulness Practice.

($B = 0.164$, $p < 0.05$). The direct effect of the practice of mindfulness on the improvement of empathy also disappears ($B = 0.131$, $p = 0.486$), if the mediation of the FFMQ factors in that relation is taken into account.

Moderated Mediation Model

Finally, the present study expected that gender would moderate the indirect association between mindfulness practice and empathy via mindfulness trait. To test the moderated mediation hypothesis (Figure 4), the present study estimated parameters regression with PROCESS macro (Model 59) by Hayes (2018).

The results of the analysis allow us to conclude that gender was not a moderator in the proposed model. None of the interactions between the predictors variables and gender was statistically significant (Table 4).

DISCUSSION

The findings found in the present work seem to indicate that mindfulness practices developed in informal settings in Spanish-speaking contexts are a significant predictor of mindfulness trait, and that these are a significant predictor of the

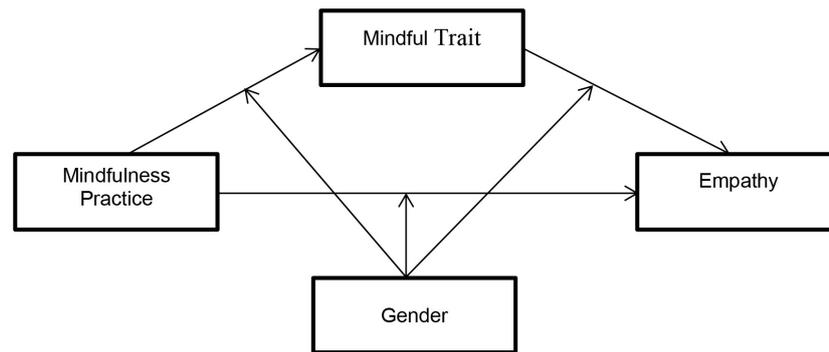


FIGURE 4 | Moderated mediation model (model 59).

TABLE 4 | Results of the moderated mediation analysis (PROCESS, Model 59).

Predictor Variables	B	SE	p
Mediating variable model (Mindfulness Trait)			
Mindfulness Practice	19.477	3.622	0.0000
Gender	15.590	9.176	0.091
Interaction Mindfulness Practice x Gender	-14.021	7.244	0.054
Dependent variable model (Empathy)			
Mindfulness Trait	0.095	0.031	0.003
Mindfulness Practice (direct effect)	1.063	1.417	0.454
Gender	8.810	6.882	0.202
Interaction Mindfulness Trait x Gender	0.322	2.834	0.910
Interaction Mindfulness Practice x Gender	-0.049	0.063	0.434

Unstandardized coefficients.

development of empathy. Therefore, our first research objective is fulfilled. Mindfulness would be a metacognitive capacity that influences later cognitive processes and, theoretically, also behavior, increasing in the individual the capacity to pay attention to their own affective state in the present moment, and also orienting them to contextual stimuli in a curious, open and accepting way (Bishop et al., 2004). According to these results, it seems that becoming aware and accepting one's own emotions could have healthy effects on attending to the other person's emotional experiences (Trautwein et al., 2014).

In relation to empathy, the meta-analysis made by Konrath et al. (2011) in which 72 studies on empathy of university students in the United States between 1979 and 2009 are analyzed, indicates that the present university students are 40% less empathic than those of twenty or thirty years ago, which is detrimental in attitudes of understanding, compassion, preoccupation or empathy toward other people. The importance of empathy in the educational field is undeniable.

There are numerous experimental researches that have observed an increase of empathy through the practice of mindfulness (Birnie et al., 2010; Shapiro et al., 2011;

Gockel et al., 2012; Barbosa et al., 2013) pointing out improvements in university students after the application of the program.

In this regard, a growing body of studies on the benefits of mindfulness has begun to show its potential as an intervention strategy to improve mental health and overall performance. Research with university students points to the need to increase this body of study, confirming the need to investigate aspects of positive functioning (Viciano et al., 2018).

Empathy is an essential element in interpersonal relationships and a central competence in the university environment (Centeno and Fernandez, 2020). The ability to put oneself in the place of the other -intellectually and emotionally- is a key factor for a more peaceful and supportive society, where relationships with others are established in a healthy way (Moya-Albiol, 2014). Research on the different forms of educating in empathy is seen as an area of special relevance due to its social and individual implications. In this sense, mindfulness is presented as a promising alternative since the attitudes and personal dispositions that it develops are intimately related to empathy. Empathy facilitates an approach to subjectivity and the way of understanding and feeling the world of others, regardless of whether it is different from our own. This approach is based on an attitude of acceptance and absence of judgment, which guarantees a sincere vision in which the image of the other is not altered by our own subjectivity. In the emotional sphere, empathy favors the establishment of an affective disposition of help. Furthermore, mindfulness helps us to recognize more subtle emotional states in ourselves and in others, facilitating our understanding of human emotions. Finally, the ability not to get carried away allows a distance to be established between others affectivity and one's own, thus avoiding a fusion between the two. Further research is needed to establish the mechanisms through which mindfulness practices in university students improve empathy or other personal and social competencies that contribute to the development of their strengths and potential.

Despite the increase in the practice of mindfulness in informal or leisure contexts, there are hardly any studies on the effects for those who practice it for this purpose, since research has focused on therapeutic or formal contexts. The results of our study confirm that even informal practice of mindfulness can

be considered a quality experience, because of the benefits it brings to the people who practice it, such as modifications in their mindfulness components or the increase of empathy. Gim (2009) consider contemplative practice as the essence of leisure because it creates a special experience that provides choice, freedom, tranquility, flow, and satisfaction. In line with our study, positive results are also obtained not only through greater internal balance but also by increasing well-being and a positive sense of health. With regard to the second objective, the dimensions of *FFMQ* that function as mediators between the practice of mindfulness and the improvement of empathy we have found two: *observing* and *describing*. No mediation on empathy was found in the dimensions of *acting with awareness*, *non-judging of inner experience*, and *non-reactivity to inner experience*. The current conception is that mindfulness consists of two distinct cognitive processes: attention focused on the present and acceptance of emotions. These two processes are often measured with *FFMQ* (Baer et al., 2006; Jones et al., 2019). The three *FFMQ* factors that shape present-centered attention are *observing* (attention to internal and external stimuli), *describing* (labeling and expressing experiences), and *acting with awareness* (attention in the present to one's own behaviors rather than responding automatically). The two *FFMQ* factors that make up the acceptance of emotions are *non-judging* (adopting an unevaluated stance toward thoughts and emotions), and *non-reactivity* (letting emotions flow without being trapped by them). According to our results, the improvement of empathy due to informal mindfulness practices is due to processes related mainly to the attention focused on the present. And for this, it would not be necessary to *act with awareness*, but it would be enough to put the focus on the stimulation we experience and be able to label it and express it correctly. It seems clear then, that paying attention to internal processes has an influence on the sensitivity to other people's needs or concerns.

If *observing* and *describing* one's own emotions increases attention to the experiences of others, that is to say, empathy, other research (Neff and Beretvas, 2013) found that people who reported that they could label their own feelings correctly also reported that they could help others overcome difficult emotions, as well as the relationship between the degree to which people are kind to themselves and the kindness they have to another person.

In the same line, we find results in the works of Jones et al. (2019) and De la Fuente-Anuncibay et al. (2019) in English-speaking samples. In both studies they use *FFMQ* as a measure of mindfulness, with practice being the predictor variable. The scale used by Jones et al. (2019) to evaluate empathy was the Interpersonal Reactivity Scale (Davis, 1994) in a sample of American university students with little or no experience in the practice of mindfulness. Their results agree in that *observing* and *describing* were related to the improvement in the empathic abilities. On the other hand, they pointed out that adopting a non-evaluative posture toward emotions (*Non-judging*) negatively predicted empathy. On the other hand, the scale used by De la Fuente-Anuncibay et al. (2019) in a sample of English university students who made informal

practices of mindfulness, was the *TEQ* (Spreng et al., 2009). Their results informed that, in addition to the dimensions of *observing* and *describing*, it influenced the dimension of not allowing to be caught by the own emotions (*Non-reactivity*) in the increase of empathy. We can suppose that the differences in some of our results, with respect to the work of Jones et al. (2019) are due to the scales used to evaluate empathy. The *TEQ* evaluates empathy as an emotional process and the content of the items has to do with the identification and understanding of others' emotions, physiological activation, altruism, and the frequency of empathic and prosocial behaviors. *IRI* evaluates empathy around four factors: Perspective taking, Fantasy, Empathic concern and Personal distress. On the other hand, the only difference of the present work with the mentioned one of De la Fuente-Anuncibay et al. (2019) is that that one was carried out in an Anglo-Saxon country and this one in a Spanish-speaking context.

We have not found other investigations that use mindfulness trait as mediators that influence the increase of empathy, being this study a pioneer in this context.

Regarding the third objective, gender does not seem to function as a moderator between the practice of mindfulness and the changes it predicts in the mindfulness trait. Neither does it moderate between mindfulness trait and empathy, nor between mindfulness practice and empathy. This is consistent with previous research (Dean et al., 2017) that used structured mindfulness programs and did not find a different gendered functioning in the development of empathy. Our results support the idea that mindfulness training is equally effective in men and women, and has the same effects on empathy in both genders.

The findings of this paper should be interpreted with caution because of its limitations. Firstly, this study is transversal and therefore does not allow for the establishment of causality. Accordingly, researches with longitudinal designs are needed to provide more evidence for the hypotheses being raised. Another limitation could be reinforced by the use of random sampling, which is more powerful than the non-probability sampling used, thus avoiding the risk of bias. Finally, the limitation of the use of self-reports for the assessment of mindfulness and empathy should be established. Although both instruments are designed on the basis of factor analyses of the most commonly used questionnaires in both constructs and have sufficient psychometric guarantees, some authors point out deficiencies in them such as the influence of subjective perception or problems in establishing real change. Thus, situational assessments or the use of biological markers for empathy (Bellosta-Batalla et al., 2017; Breithaupt, 2009) or objective monitoring (Quintana and Rivera, 2012) and the use of behavioral measures of mindfulness practice (Grossman, 2011) are proposed.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Bioethics Committee of the University of Burgos (IR 15/2018). The patients/participants provided their written informed consent to participate in this study.

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Distributing Feedback Wisely to Empower Girls in STEM

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SELF-EFFICACY, OUTCOME EXPECTATIONS, AND INTEREST AS KEY VARIABLES FOR THE FORMATION OF STEM ASPIRATIONS

For decades, only one-fourth of women have comprised the total number of people in STEM professions in the EU. This is an alarmingly low number. With labor markets continuing to communicate an increasing need in STEM workforces, this low number signals unfulfilled talent that is otherwise greatly needed in many critical fields. There are a number of situations where girls and women stumble along the path to a STEM career. Some of these occur in the formative years of primary and secondary education, during which time a majority of girls feel (and are in fact) estranged from STEM subjects. Experiences in school and in the classroom appear to reinforce these experiences instead of preventing them.

The development of academic aspirations in STEM, and promoting the desire to have a career in STEM can be understood as a long-term developmental process in which decisions are formed via the interaction of personal characteristics along with environmental structural and social factors like educational institutions, school, teachers, family etc. (Watt et al., 2006; Lent and Brown, 2019; Turner et al., 2019).

STEM self-efficacy, STEM outcome expectations, and interest are key variables for a choice of academic and vocational STEM courses and careers over the course of education and working life (see **Figure 1**). Self-efficacy in STEM describes an individual's belief about his or her capability to manage and solve tasks. Outcome expectations are personal beliefs about the consequences of task-specific behavior. They include experiences and what people think and expect about extrinsic and intrinsic reinforcements, for example external rewards like good grades; experiencing internal, self-directed consequences like being proud of an accomplishment; or even being fully absorbed in a task. Self-efficacy beliefs and outcome expectations are important for the formation of interest in an academic field. Individuals develop interest in fields or activities when they feel competent and anticipate that their performance will yield favorable outcomes (Lent and Brown, 2019). STEM self-efficacy, outcome expectations, and interest are crucial for the formation of goals in STEM, for example the intention to enroll in a course, to pursue an academic major or to attain a certain level of performance. Favorable, yet realistic self-efficacy, positive outcome expectations, and interest in a field help individuals to make the best possible use of their potential.

Girls can be regarded as an at-risk group when it comes to self-efficacy, positive outcome expectations, and interest in STEM fields. They are more likely than boys to attribute failure in STEM to a lack of their own ability. Over the course of childhood and adolescence, self-depreciatory assessment and pessimistic outcome expectations lead to avoidance of STEM, unhelpful learning behaviors, lower performance, and less interest in STEM (Ertl et al., 2017; Luttenberger et al., 2018). So it is not surprising that girls shy away from STEM (OECD, 2015), especially in light of the fact that school and learning experiences

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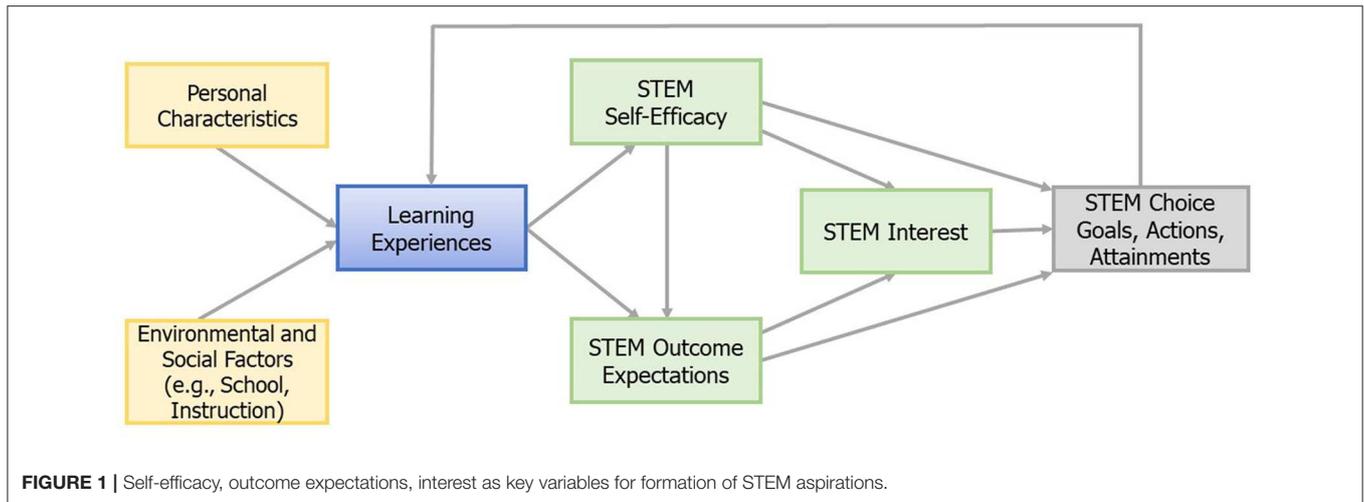
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often contribute to this. The present article, therefore, discusses the impact of learning experiences for empowering girls in STEM courses. Teacher feedback plays an important role in this process, and thus different types of feedback and their possible influence on students' learning will be discussed.

IMPORTANCE OF LEARNING EXPERIENCES

Learning experiences in school and other social contexts are the main source of self-efficacy development and outcome expectations. Teachers, parents, and other significant persons influence children in their beliefs about and attitudes toward STEM. By choosing adequate instructional strategies, selecting appealing learning content, and interacting with students, teachers may enhance feelings of self-efficacy, provide for positive outcome expectations, and promote interest in STEM for both boys and girls. Teacher feedback is particularly influential when it comes to girls' beliefs about and attitudes toward STEM (She, 2000).

Girls rely more on teacher feedback than boys to assess their performance in STEM. Even high-performing girls rely less on their grades as an indicator of their knowledge, and look to their teacher instead (Skipper and Leman, 2017). Their critical self-assessments are often accompanied by their belief that talent is the main requirement for success in STEM; moreover, these negative self-assessments can be intensified by gender stereotypes that attribute STEM talent exclusively to boys/men (Luttenberger et al., 2018).

In light of these disadvantages, it would appear even more important for teachers to empower girls in the classroom. However, research shows that teacher feedback often fails to support girls in STEM. Girls receive less instructional and discussion time in the STEM classroom than boys, and are less often the focus of classroom interaction, receiving less feedback (Skipper and Leman, 2017). Teachers also often attribute boys' STEM achievement to talent and girls' STEM achievement to effort and hard work (Burnett, 2002), conveying the message that

STEM subjects are not for everyone. When teachers themselves hold gender stereotypes, they may communicate discouraging messages about STEM without even being aware of doing so, or without recognizing that their attitudes might be biased (Smith et al., 2012).

FEEDBACK THAT EMPOWERS GIRLS' MINDSETS

Feedback can focus either on the person or on learning processes and learning behaviors as a source of achievement. Person-related feedback refers to a learner's unchangeable characteristics (for example "you are talented in mathematics") and supports the development of a so-called fixed mindset. Learners with a fixed mindset assume that ability, talent, and intelligence within a person are pre-determined and cannot be changed (Dweck, 2007). Consequently, the self-efficacy of these learners is tied to their assessments of their assumed stable personal characteristics.

Mindsets may change depending on academic domains; a person may hold different mindset beliefs in different areas. Furthermore, in the overall population of students, specific domains are associated with success requiring either talent or hard work. Students are particularly likely to see physics and mathematics as subjects in which success depends on innate ability (Aguilar et al., 2014). With girls in particular, STEM mindset beliefs are often intertwined with stereotypes about female inferiority (Ertl et al., 2017; Luttenberger et al., 2019). When students with a fixed mindset encounter a difficult problem or concept, they see these difficulties mainly as expectable evidence of their lack of innate ability. They tend to seek out easy problems (to prove their ability) and avoid challenging ones that would help them progress in their learning (Dweck, 2007; Skipper and Leman, 2017). As Freudenthaler et al. (2008) could show, task avoidance is an important predictor for girls' school achievements.

In contrast, process-related feedback focuses on learning processes, effort, and the way a person approaches a task (examples would be "you tried hard at this" or "you found the

right strategy to approach this task”) (Harks et al., 2014). It supports development of a growth mindset, i.e., the belief that talent and ability are malleable and can be improved (Dweck, 2007). Learners with a growth mindset assume that they may influence their learning achievements via effort and adequate learning strategies.

Process-related feedback has advantages over person-related feedback. It provides encouragement and informs about concrete strategies and behaviors for improvement (Dweck, 2007). Process-related feedback is especially efficient when it informs beyond the adequateness of learning *results* and also provides information about the adequateness of the learning *processes*. In a study on logical mathematic-related tasks, process-related feedback had implications on children’s choices of future tasks and their outcome expectations. Children who had received feedback on the adequateness of their effort were more likely to choose tasks that point to mastery goal orientations and intrinsic rewards (for example, they chose “problems that I’ll learn a lot from, even if I won’t look so smart”; Mueller and Dweck, 1998, p. 36) whereas children who had received person-related feedback chose tasks that pointed to performance goal orientation (for example, they chose “problems that aren’t too hard, so I don’t get many wrong,” Mueller and Dweck, 1998, p. 36). These feedback effects can already be observed in younger children. In two investigations with 5 to 6 year old children, those who received person-related feedback (expressed as comment of a fictitious teacher’s pride of or disappointment in a pupil) were more likely to assume that already a single mistake points at stable learning deficits than children who received process-related feedback (expressed as pointing out correct or incorrect solutions, comments on effort). Children in the process-related feedback group also expressed higher motivation and showed more persistence (Kamins and Dweck, 1999).

Process-related feedback and the attribution of success to effort and own learning behavior is also related to higher levels of task persistence, their enjoyment, and interest in them. Learners who attribute success to their learning behaviors and effort also compare their task outcomes less to the outcomes of other learners (Mueller and Dweck, 1998).

However, despite these advantages of process-related feedback, it seems that girls do not always benefit from it in STEM classrooms, especially when they maintain a fixed STEM mindset that is intertwined with gender stereotypes. And not only girls with lower or medium abilities, but even girls with high abilities and interest are susceptible to stereotypes against women in STEM (Ertl et al., 2017).

In a study with students in secondary education (Skipper and Leman, 2017), process-related feedback failed to raise the attractiveness of possible STEM careers (feedback indicated either that students would be suited to take a STEM course because they work hard vs. or because they are clever). Here, person-related feedback was more successful; it suited students’ prior assumptions that success in science is mainly due to innate ability. Correspondingly, person-related feedback emphasizing students’ high ability levels was more efficient for attracting students to a STEM career than feedback interventions that attributed success in STEM tasks to learning processes and effort. Especially girls are doubtful of their self-efficacy in STEM and

rely on interactions with teachers and on their assessments of their ability (Zeldin et al., 2008). Studies on mathematics show that such doubts of self-efficacy and abilities are connected to avoidance of math and science courses (Ashcraft and Moore, 2009). Forsythe and Johnson (2017) point at the important role of the interaction between students’ already existing mindsets and feedback; their studies suggest that educators should not only prefer process-related feedback but also take into consideration that they have to change students’ negative fixed mindset and beliefs of assumed inferior stable ability levels.

These results emphasize how STEM educators face conflicting effects of the two types of feedback. Person-related feedback has undesirable long-term effects, especially in case of failure, for example in how it decreases the likelihood to choose challenging and difficult tasks and ties self-efficacy assessments to estimation of talent. However, with a fixed and gender-biased mindset, girls may misinterpret the usually more favorable process-related feedback and believe that a teacher is actually pointing out their lack of talent whenever she/he praises their learning behavior and efforts (Skipper and Leman, 2017).

Taken together, the studies discussed here would recommend a combination of person-related and process-related feedback in STEM classrooms, applying each for different purposes. Person-related feedback is especially important for countering girls’ stereotyped beliefs about their lack of talent. Teachers can use person-related feedback (on talent, ability, or pointing out role models similar to the person) to build up their female students’ confidence especially of those students who believe that as girls they “are not cut out” for STEM fields (Luttenberger et al., 2018).

It however needs to be complemented by process-related feedback which focuses on learning processes and effort. With its focus on effort and learning processes, process-related feedback delivers its message without singling out specific personal learner characteristics like gender, talent etc. This feedback is needed to build up self-efficacy beliefs that success in STEM is based on effort and effective learning strategies. It serves to provide for positive outcome expectations where task fulfillment is experienced as rewarding and self-induced; and it, therefore, supports the development of interest in a field in form of positive attitudes and experiences when being engaged with learning contents. As this type of feedback is related to persistence, motivation and effort it has positive long-term effects, making it very useful for empowering girls in STEM.

CONCLUSIONS AND NEED FOR FURTHER RESEARCH

This discussion of feedback points at a problem that has rarely been considered in research on learning and instruction. Studies on teacher feedback mostly focus on the beneficial effects of process-related feedback and the support of a growth mindset, while studies on gender stereotypes in STEM mostly focus on how girls’ stereotypes can be eliminated, even though these approaches ignore the undesirable effects of person-related feedback. Results of the studies on teacher feedback often can be explained by the use of tasks in neutral or new knowledge domains. However, when students (in STEM mostly girls) already

carry negative mindsets of their abilities, process-related feedback may lead to different results. Very few studies have considered this special situation that process-related feedback for girls in STEM fails in achieving its positive effects when encountering stereotyped, fixed mindset beliefs (an exception is the study by Skipper and Leman, 2017).

Therefore, the present article intends to point out the conflicting effects of feedback, it attempts to give first recommendations for teachers. However, most importantly it points out that the orchestration of person- and process-related feedback in STEM classrooms will require more detailed investigation.

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Breaking Cultural “Taboos” About the Body and Gender: Brazilian Students’ Emancipation From a Thematic Perspective of School Physical Education

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In order to understand the problems related to equity and diversity, we can first recognize that school physical education potentializes processes of a cultural context that has, directly and indirectly, interfered with the body and its relationships. We live in a still retrograde society, which has its foundations established in hierarchical relations of power and that women are often devalued in many sectors, especially in contexts of deep social exclusion. However, the body is the result of cultural construction and the concept of “natural” coexists within the culture. Then, it is necessary to problematize and (de)construct concepts that reinforce prejudiced/discriminatory attitudes. Our objective in this article is to interpret how high school students’ relationship to knowledge allows situated interventions on gender issues by undergraduate students from one physical education teacher education program. Methodologically, we used a qualitative approach to develop interventions in one high school in the city of Fortaleza, Ceará, Brazil, in two stages: (i) questionnaire to consider the students’ knowledge related to gender issues; (ii) intervention to work on issues of gender and social inequality. As a result, we have identified as essential to list such issues in the school environment, because it is in the school that we live the plurality of being and establish various social relations, locating them critically. We recognize that the challenge of intervention is beyond problematizing classes, but in educating students as autonomous and emancipated individuals as they can construct their own (self) critique. In conclusion from the analysis of those interventions, it was possible to strongly observe the existing hierarchical relations. In this sense, we emphasize the importance of the teacher to address thematic that generate learning with respect to the male and female bodies in the classes, so that there is a better understanding of the differences to foster the critical and emancipatory expansion of gender equality.

Keywords: relationship to knowledge, teacher education, curriculum, gender equality, high school, university education

INTRODUCTION

Gender-related prejudice and inequalities are remarkably expressed in the current right-wing Brazilian governmental discourses against teaching practices around gender (Knijnik and Luguetti, 2020). In this article, we aim to contribute to the eradication of gender inequalities through the voices of high school students and their relationships to knowledge. There are challenging questions about the pedagogical practice of school physical education, such as didactic and relational issues, which affect teachers and students in Brazilian basic education. Some theoretical and methodological propositions point to the criticality of the teaching and learning processes. However, during the initial teacher education, there are themes that are little addressed as relevant demands for teaching intervention. According to Jacó and Altmann (2017, p. 3), “physical education classes, which have their attention on the body and movement, have long been understood as a fundamental instrument in schools for the education as discipline of the body and its senses.”

This type of bodily education, according to Jacó and Altmann (2017), was based on the dichotomy between male and female. In this sense, the organization of spaces and classes was designed separately for the male and for the female students. However, there are new proposals for thinking about the body, corporeality and movement as dynamics that permeate school physical education (Penney, 2002). It is not appropriate, for example, for teachers to limit their actions to legal guidelines understood in a shallow manner to promote participation and involvement in learning situations, regardless of sexual orientation and gender and considering the health conditions of each student (Brazil, 1996). However, there are still differences in the ways of organizing classes (Corsino and Auad, 2012), as well as in the engagement of students (Jacó and Altmann, 2017). The subtlety of some of these differences during physical education classes indicates dispositions for maintaining historically predefined places for each gender, which we understand as “taboos.”

Thus, in order to understand the issues related to equity and diversity, it is necessary, firstly, to recognize that school physical education is a potentializer of processes of cultural contextualization that have directly and indirectly interfered with bodies and (inter)personal relationships. Machado and Pires (2016) emphasize that, since the approval of the National Law of Guidelines and Bases for Education (LDBEN) in 1996 (Brazil, 1996), physical education is considered as a mandatory curricular component, being responsible for the elaboration of the pedagogical political project (Venâncio and Darido, 2012). Therefore, physical education teachers are able to propose to the school collective that the focus of discussions about the body and sexuality could be effectively included and contextualized in the schooling process.

However, we live in a society that is still retrograde and conservative and whose foundations are based on hierarchical relations of power that devalue women, in various sectors, especially in contexts of profound social exclusion, such as school (Franco, 2018). In addition, the current Brazilian extreme right-wing government makes it difficult for women to fight against poverty and hunger; it reinforces and promotes violence; it

worsens the conditions of access to housing, healthcare and education; it accentuates historical and structural injustices and generates more inequality and social exclusion (Lavinias and Gentil, 2020). This context affects the life of each human being, each individual, each body and their intersubjectivities.

We know that the understanding of the body is the result of a cultural construction, in which the concept of “natural” coexists due to the intervention within culture (Goellner, 2010). Then, it is necessary to problematize, deconstruct and reframe concepts that reinforce the naturalization of prejudiced attitudes and discriminatory behaviors. As we immerse ourselves in the school context, the contemporary debate on gender relations denotes a polarized political sense – typical of political parties – that masks the importance of these discussions and reflections in the fight against “taboos” that reproduce different forms of oppression.

In addition, Brazilian women are part of this problem more broadly, due to the convergence with other factors, such as the racial factor, which remains historically and socially segregationist, most of the time, at school, in the family, in housing, at work and affects the living conditions in society as a whole. According to Lovell (2000, p. 88), “race, gender and class shape the lives of all Brazilians inseparably.” This vicissitude is imbricated in the country in such a way that it affects the educational processes, culminating in the discrimination of women, mainly in the devaluation of the relationships to knowledge of black women (Venâncio, 2019). Therefore, we assume intersectionality as a perspective for our analysis, under a complex logic of intersections between social relations in mixed dynamics of race, gender, and class (Corsino, 2019).

In the context of schooling, according to Marrero (2008), these relationships to knowledge are consistent with the need for the school to be transformative so that women are not subordinated to gender inequality. For awareness and criticality in educational processes – with the aim of promoting social justice (Schenker et al., 2019) – it is essential that the school does not reproduce the inferiorization of women and that it does not perpetuate the hierarchy based on historical and social inequalities. Schooling can reveal possibilities for new construction of relationships to knowledge (Charlot, 2000), without discrimination and seeking to break obstacles to the consolidation of a democratic society, such as a school that promotes (self) critique and human emancipation (Oliveira and Venâncio, 2017).

During the physical education degree course, two authors of this study had the opportunity to mobilize knowledge from disciplines and programs that enhanced democratic aspects and social justice. Some of those actions provided experiences based on knowledge from the schools’ realities and reflection on their own pedagogical practices. In addition, their experiences fostered the development of research projects in school physical education by both authors, within the scope of the academic master’s degree in the Physical Education Graduate Program at the Federal University of Rio Grande do Norte. This study covers a common problem to their research, with the mediation of their advisor and the critical participation of a professor-researcher, who collaborate as co-authors of this article. Our objective is to interpret how elements of the relationship to knowledge – of high school students – enable

interventions on gender issues – by undergraduate physical education students.

METHODOLOGICAL PATH

The study is anchored in qualitative research characteristics, situated as an investigative process that did not have any generalization claims, as advised by Alves-Mazzotti and Gewandsznajder (1999) and Sandín-Esteban (2010). As an itinerary, we highlight that the theoretical and methodological starting point is a discipline – Physical Education in Elementary and High School – offered in the second semester of 2018 and attended by the two main authors during their initial teacher education as undergraduate students at the Institute of Physical Education and Sports of the Federal University of Ceará. On the one hand, the theoretical catalyst from the course was the discussion, critical analysis and thematization of official documents guiding Brazilian basic education, such as the National Curriculum Parameters (PCN) (Secretaria de Educação Fundamental, 1997), the National Common Curricular Basis (BNCC) (Secretaria de Educação Básica, 2020), the Regional Curriculum Matrices (Secretaria da Educação, 2019) and the National Curricular Guidelines (Secretaria da Educação Básica, 2006, 2013). On the other hand, the methodological catalyst was the students’ experiences and ways of accessing the knowledge about certain content in high school physical education classes. In this sense, there is emphasis on the qualitative and descriptive field approach to reveal the “taboos” in one class of high school students from a school located in Fortaleza, the capital city of Ceará State in the northeast region of Brazil.

Context

The school has been chosen due to the availability of the physical education teacher responsible for the class and the agreement of the school management. The school – as a public institution of regular education – has a total of 246 students, according to the basic education development index (Instituto Nacional de Estudos e Pesquisas Educacionais Anísio Teixeira [INEP], 2019), located in a central neighborhood of the municipality, whose human development index (HDI) is 0.574, being in the 19th place in the regional districts table II, as based on census data from 2010 (Secretaria de Desenvolvimento Econômico, 2015). The school has students who live in different regions of the capital and has been suffering a reduction in the number of enrollments annually.

Participants

The choice of students was made randomly with the class that was available at the time we selected to conduct the research. There are 26 students who participated voluntarily with the necessary agreement. The participants justified that they would not include their gender identities in the responses to the questionnaires and that they understood that the absence of this information would not interfere in the evaluative process of their reflections. They understood that each person’s verbal report would contribute to the research.

Research Procedures and Data Analysis

As a critical collaborator (Luttrell, 2005), the professor-researcher responsible for the course – who has followed the academic trajectory of the two master’s students since their degree course – is a co-author in this study. The work was organized in two phases. We initially performed a documentary analysis in four sources, considering how themes related to gender and sexuality were cited. We highlight, in **Table 1**, the number of times that the terms “gender” and “sexuality” were mentioned in the documents, specifically regarding physical education, and an excerpt referring to breaking paradigms. We emphasize that the word count was based on approximations from a search for terms in an isolated or literal way, including correlated terms (such as “man” and/or “woman”).

After the documentary analysis, we carried out a second phase, based on a questionnaire with illustrations by Brazilian designers and cartoonists (Zirardo, Laerte, Alaúde, Carol Rossetti, and Rafael Babuena) and interventions that were grouped in two stages: (i) analysis of the responses to the questionnaire about the students’ knowledge related to gender issues and sexuality; the questions form was used – through writing and orally – in a 9th grade class at elementary school, with 30 students, and in a 2nd grade class at high school, with 26 students; (ii) analysis of the intervention carried out in the high school class context, to address issues of gender and social inequality. We opted for the emphasis on the high school class due to the absence of specific terms on the subject in the curriculum document. The participants and their legal representatives agreed with the school’s consent to conduct the study, which is part of a broader research project, duly approved by the institutional research committee to which it was submitted. We compared the data generated in both phases to present and discuss the results.

A careful analysis of the questionnaire responses was performed. The data survey emerged, primarily, in a quantitative way – the themes in **Table 2** – that formulate the “taboos” addressed in this study, but we have highlighted only the qualitative data, as we realized that from this type of approach several meanings inherent to culture emerge (Minayo, 2008). We identified the need for advancing this research beyond punctuality in data written from the questionnaire. Then, we used in a collaborative way the production of a lesson plan – based on Sanches Neto (2017) – consisting of a systematization of school physical education content.

RESULTS AND DISCUSSION

The intervention praxis was based on five learning moments highlighted in **Table 2** below.

Understanding the embedded logic in the classes’ dynamization, we believe that declarative knowledge (Sanches Neto, 2017) – which is unexplored several times – undergoes without due attention but it emerges when exploring both the “taboos” theme and the possibility of students have their speech respected, their own language listened, confirming their active voice. In an attempt to foster steps that are built for a fairer education – reducing the problem of

TABLE 1 | Documental analysis.

Curriculum document	Recurrent terms	Excerpt
National Curricular Guidelines for Basic Education	Gender: 7 times Sexuality: 6 times	"They should also include debates, studies and discussions on sexuality, gender relations, sexual and religious diversity, overcoming racism, discrimination and racial prejudice" (Secretaria da Educação Básica, 2013, p. 431).
Curricular Matrices for High School in Ceará	Without incidence of terms or correlated forms	No relevant excerpt (Secretaria da Educação, 2019).
Physical Education for Youth and Adult Education	Gender: 4 times Sexuality: 3 times	"Issues around sexuality can be approached from cross-cutting themes" (Secretaria da Educação Básica, 2006, p. 217).
National Curricular Parameters for Elementary School	Gender: 4 times Sexuality: 3 times	"We know that this will only be achieved if we offer the Brazilian children full access to contemporary [...] concerns on the environment, health, sexuality and ethical issues related to equal rights, human dignity and to solidarity" (Secretaria de Educação Fundamental, 1997, p. 4).

TABLE 2 | Intervention praxis.

Learning moments	Highlights
Moment 1 – Differences game – It was the initial moment which objective was for each student to speak some characteristic that makes her/him unique and different in the group.	Something important to mention is that one of the students said "I am the only one who is a father."
Moment 2 – Cabbage game – Students discussed current news about sports and the differences in the recognition and appreciation of female and male sports.	The "cabbage" is a ball made of loose papers with previously written headlines. When reading the headlines, the students discussed and debated things they stopped doing because they were stereotyped as "boy stuff."
Moment 3 – Social mirror – Several commands were given and students who identified themselves with the said phrases had to take a step forward.	"Take a step forward if you do not need to help with household chores" or "Take a step forward if you are not afraid to walk alone on the street." The idea was to discuss the concepts of privilege and meritocracy so that they could see that not everyone leaves from the same "starting point."
Moment 4 – Assuming an identity – Students put signs on their backs with "false identities" and could not see what was on their backs.	Characteristics of sexual orientation were written, such as: "homosexual," "bisexual," "heterosexual," and "asexual" which generated some comments and several laughs.
Moment 5 – Conversation round – We heard students talking about activities, and how much it is necessary to talk and work on gender issues.	Some students raised that during the intervention these themes came up involuntarily.

silenced bodies (Corsino, 2019) that the school and other institutions promote daily – we meet the need to open paths that teachers and school principals make themselves present with sensitive and welcoming listening to recognize the students' knowledge and experiences, and to encourage their participation and involvement to learn critically. The following questions point to specific gender issues in the participants' perspectives.

Why Do I Have to Say Whether I Am a Male or a Female Student? What Does It Matter?

To present the results with consistency, we need to explain that several elementary and high school students did not want to identify in the form whether they were female, male or other. As it was a work based on documentary, exploratory and descriptive analysis, we understand that this fact did not compromise the findings and made us present excerpts that would meet the proposed objectives.

To understand gender as a constituent of the individuals' identities, Louro (1997) points out that we need to understand that everyone is constantly (re)building and transforming her- or himself in their social relations. It is important to demonstrate to

students that they have situated places of speech and listening, so that they feel free to understand aspects of their identities and their sexualities, considering both as constructs. In Ribeiro's (2017) critical perspective on the place of speech, language serves as a device for conserving power from a colonization process based on oppressive thoughts.

The questionnaire used with the classes consisted of cartoons and problematic situations that encouraged students to think critically about the problems mentioned. **Table 3** shows three questions extracted from the form, in which we can see how the themes are present in the students' daily lives, as well as their relevance.

From the critical analysis of each answer, highlighted as their responses, we have realized that there are stereotypes linked to the individuals' roles and their representativeness. For example, in question 2, when dealing with the association of words with the role of men and women in society, there was an emphasis on physical characteristics, accessories and stereotypes about women. However, when words were asked about the role of men, the focus was on characteristics that highlight male virility and professional aspects. This evidence reaffirms the observations by Cruz and Palmeira (2009) that, historically, the secondary role is mainly attributed to women.

TABLE 3 | Thematics.

Questions	Responses
1. Write words that you think are linked to sexual diversity?	Gay, fear, prejudice, acceptance, normality
2. Write words that you think are linked to the role of men and women in society (profession, physical characteristics...)	Woman: pink clothes, makeup, big hair, doll, sensitive Man: football (soccer) player, strong, serious, worker, dressmaker
3. Do you think the school should teach about sex education? Why?	All responded positively, justifying the importance of learning about pregnancy and reproduction, vision of the future and preventing complications

Another point that caught our attention was the moment when we left it open for written or spoken comments on the subject. We have heard sensibly comments such as: "I still think it is ridiculous for people to say that there is a game just for girls and other for boys;" or a feeling of revolt expressed by a student when she says: "I feel disgust and revolt when these inequalities happen, people who occupy the same positions with different salaries for being a man or a woman. Society is sexist."

According to the notion of relationship to knowledge (Charlot, 2000), these comments – which resonate openly in the dialogue with the class – may represent components that disadvantage the mobilization of individuals to learning and participation in physical education classes. However, paradoxically, they can also emphasize the place of speech of invisible students. Thus, according to Cameron and Humbert (2020), it is an attitude like these that constitutes the "strong girls" as capable of transforming the classroom environment to reduce student behaviors that reproduce inequalities as practices. Teachers can foster learning, contributing to the understanding of differences and the careful conceptualization of gender equality (Adichie, 2017).

We highlight some responses from elementary school students, which address the relevance of this theme in their lives. One student mentioned that he would like to assume his homosexuality and that working on such issues at school would help him. We were surprised by this data, as well as we were faced with several comments from students criticizing the election of the extreme right-wing candidate for the presidency of Brazil, arguing about their racist, sexist and homophobic attitudes. The responses of high school students focused on gender relations in society, with some comments and doubts about the use of the social name. Mention was made of the federal decree, approved in 2016, which guarantees the recognition of gender identity (Presidência da República Secretaria-Geral, 2016). In addition, there was a brief discussion about same- sex and/or gender marriage.

We analyzed the students' responses with the intention of elaborating two interventions to address, as main objective, the questions raised by the students themselves. Through these interventions, especially the intervention carried out within the high school class, we were able to identify that it is absolutely essential to address such topics in the school context. It is at school that we identify and live the pluralities of the human being and affirm our intersubjectivity in social relations, placing ourselves critically (Ribeiro, 2017). Based on the studies by Corsino and Auad (2012) and Betti et al. (2015), we recognize that the challenge of the intervention is not only in proposing

classes that problematize, but that there is also a need to educate students as autonomous and emancipated individuals, who fully exercise their (self) critique. In this sense, we understand that it is possible to approach the theme even in lessons that are not exclusively planned to address this subject, because it is present at different moments in everyday life.

The Bodily Experience as Complex Relationships to Knowledge

The body has variations in meaning as it is influenced by time and culture, it itself is historical and evaluative. On the one hand, the rise of modernity brings to light the body's perspective as a center for discussions about its productive, sanitary, moral and control functions in society (Bracht, 1999; Costa et al., 2018). On the other hand, the term corporeality appears as a product of philosophical reflections in the search for human emancipation in agreement with the dialectics of the complexity of the body.

Still from the perspective of a reflexive analysis about the bodily experiences, it is important to highlight the countless social demands that surround them. Based on such requirements, we can perceive the complexity of the relationships we create with our own body and with the body of the other. Such complexity can influence the acceptance of the changes that occur as well as generating a search for reaching certain standards often propagated by the media (Franco et al., 2018).

School physical education, historically, has contributed both in the corporeal dimensions and their functions before society, as well as in the scope of polysemic discussions of bodies. With the Brazilian re-democratization, progressive and critical theoretical-methodological proposals promoted changes in the teaching and learning process. Currently, taking into account the criticisms of the curricular documents that guide the work within school physical education, we perceive gaps when relating them to the students' knowledge and the relevance in each school reality. We understand that a coherent lesson needs to be integrated into life and that it is impossible to achieve it without knowing the students' reality, valuing their needs, as well as considering their knowledge and their relationship to knowledge.

School physical education holds movement as a primordial element for learning, but also interdependent on cultural elements, interpersonal aspects, and environmental demands, as suggested by Sanches-Neto and Betti (2008). While meeting this necessary convergence for the complexity of the classes, we consider that the teacher learns – about how to improve pedagogical practices – from essential debates on the body in the school's time and space (Costa et al., 2018).

According to Betti et al. (2015), there is a dialogical relationship between world and movement. In this relationship, it is not possible that they exist under some isolated configuration, as one is immersed in the other. Thus, assuming dialogics as a premise, we realize that the relationships that were previously considered external to the school, in fact never were. These relationships to knowledge are part of the construction of each human being.

Merleau-Ponty (1999), when reflecting on the emerging distance from himself with his own body, understands that there is no dissociation, as there is a dynamics of rediscoverings of the meaning of the world, such as "being in the world." In educational circumstances, we recall the meanings that relate physical education to students as powerful bodies in a progressive demand for emancipation.

According to Charlot (2000); So and Betti (2018), and Venâncio (2019), learning is a mandatory condition for human beings because, in order to live in the world, it is necessary to learn to establish dynamic relationships with the world and with other humans. This dynamic is intersubjective and, therefore, to understand the relationship between school physical education and gender issues, we need to get rid of some socially (pre)established concepts. It is necessary to refute from anatomical or biological justifications for the separation of male and female students in their experiences of sports to the analysis of the behavior of the bodies, biasing the female as a characteristic exclusively of girls and the male a characteristic of boys, which is a representation that persists culturally in the classes.

The aspects of masculinity and femininity are socially constructed concepts so that, as teachers, we do not cast our students on erroneous expectations. Therefore, when mentioning the relational aspect of gender, it is important to emphasize that femininity cannot be understood without accounting masculinity and vice versa. According to Santos (2010), the stereotypes linked to the construction of the meanings of femininity and masculinity are directly related, that is, changes in one generate changes in another. Which leads us to consider that genders are continually made throughout existence and these changes – according to Altmann's (2006) perspective – show that gender and sexuality polarities are socially constructed, therefore being subject to problematization, deconstruction and reframing.

According to Auad and Corsino (2018), there is also a discourse anchored in religious fundamentalism that criminalizes the idea of elaborating gender and sexuality issues in the school environment. This discourse is frequent, although it is visible that in the realities of schools such issues are eminently present, not only in physical education classes, but also in the daily life of human relationships. Jacó and Altmann (2017, p. 20) says: "But, if the segmentation of boys and girls has been overcome, gender inequalities in classes are still a challenge." Therefore, it is important to consider the students' experience as a starting point for thinking about learning pathways and processes in physical education.

It is crucial to realize that the students' experience and knowledge is what should move the classes forward. Giving voice – and ears – to students is not only about

"correcting" their actions; sometimes, we want to give students a voice as a way to "compensate" for our own reality (McLaren, 1997). Understanding the context of physical education classes first involves letting go of the binary analyzes that constitute a biased femininity and masculinity, so that we can overcome the prejudices (as limitations) that we impose – sometimes involuntarily – on the students' bodies.

Another point that we need to address is that it is not coherent to treat these themes in isolation, as if they were present only at school, as they are constructed in a non-linear way in each culture. It is up to the school and physical education as a curricular component, respectively, to assume their political and social functions and their pedagogical intentionality, and in fact, to give voice and listen to the students' voices.

Criticism in school physical education has theoretical and methodological assumptions that refute the simplistic dualisms established historically. In this sense, the strengthening of the specificity of the area can provide didactic-pedagogical actions in the classes so that each teacher, in agreement with his/her students, contribute to the elaboration of knowledge in a collaborative way. In turn, there would be ways to build and promote social justice, so that teachers and students can discuss and problematize conditioning aspects of socialization, social stratification, and inequalities of power in their lives and in other individuals'.

According to Jacó and Altmann (2017), students have different modes of participation and engagement in physical education classes, and it is common for girls to have more limited participation and less involvement due, among other factors, to the meanings attributed to body content and practices. School curricula select knowledge, through power relationships, which reinforce sectarian views in the construction of the identities of specific individuals (Jacó and Altmann, 2017). Therefore, the curricular knowledge that officially circulates within the school is neither neutral nor disinterested and was selected among several other culturally produced knowledge. Therefore, like Hooks (2013), we advocate for the sense of transgression in relation to this kind of biased knowledge because the school is a place of confrontation between places of speech.

CONSIDERATIONS

We consider that there are observable hierarchical relationships and that students consider gender and sexuality issues relevant in physical education classes. We also identified that teachers could problematize and teach thematic content for learning with respect to male and female bodies, contributing to the understanding of differences and the (re)construction of concepts with critical and emancipatory expansion of gender equality. The school is one of the places of confrontation of interests between the status quo and the individuals, who create their own relationships and meanings. In the Brazilian context, the

public school is a space of resistance and schooling engenders a transgressive temporality.

Analyzing the path taken in this research, we reinforce the perspective of Cameron and Humbert (2020) as the themes of gender and sexuality become visible to students, explaining some inequalities in social and school contexts, encouraging them to question the legitimacy and the source of certain ideals (as patriarchal and hierarchical), creating an environment more conducive to reflection and the redefinition of social relations. We suggest carrying out investigations that broaden the views and the possibilities of promoting social justice. As a way, we point to the collaboration between teachers-researchers, to make explicit the relevance of new nuances in the students' relationships to knowledge.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation, to any qualified researcher.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by the Research Nucleus at the Institute of Physical Education and Sports of the Federal University of Ceará. Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin. Written informed consent was obtained from the individual(s) for the

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CL contributed to the study conceptualization and led the preparation of the manuscript. EF, LS, and LV helped with the study conceptualization and provided feedback on drafts of the manuscript. All authors contributed to the article and approved the submitted version.

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Evaluation of Sexist and Prejudiced Attitudes Toward Homosexuality in Spanish Future Teachers: Analysis of Related Variables

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Discrimination and inequality on the basis of gender and sexual diversity remain prevalent in today's society (Beck et al., 2010; Dispenza et al., 2012; Dugan et al., 2012; Barrientos and Cárdenas, 2013). These situations of exclusion and rejection show the need to train individuals and organizations in the prevention of violence, harassment and inequality (Kattari et al., 2018). Teacher training, both initial and ongoing, is a fundamental axis of action, and consequently, the study of the opinions and beliefs of students and teachers on these issues. This research, therefore, analyses the sexist and prejudiced attitudes toward homosexuality of future teachers in the Spanish educational system. The sample of this research is made up of 452 students in the Degree in Primary Education Teaching and in the Master's Degree in Compulsory Secondary Education, Upper Secondary Education, Vocational Training and Language Teaching (MUPES) with an average age of 24.74 ($SD = 6.51$). For the collection of information, a questionnaire was used consisting of questions on sociodemographic and cultural aspects, the Inventory of Ambivalent Sexism (ASI) by Glick and Fiske (1996) validated in Spanish by Expósito et al. (1998), and the Scale of Attitudes of Heterosexuals toward Homosexuals (HATH) by Larsen et al. (1980), validated in Spanish by Barrientos and Cárdenas (2010). The main results include the presence of significant differences ($p < 0.01$) in the levels of ambivalent sexism (hostile and benevolent) and in the maintenance of negative attitudes toward homosexuality according to sex and political ideology.

Keywords: sexism, heterosexism, homosexuality, teacher training, ideology, attitudes

INTRODUCTION

The scientific and social interest in equal rights and opportunities for women and people with sexual and gender diversity is undeniable. The different countries have been adapting their legislation and policies in order to reach greater levels of equity and equality. Although many rights have been won in recent decades, they are still insufficient to address the needs of these people in a comprehensive manner (Platero, 2009). Discrimination and inequality on the grounds of sexual and gender diversity continue to be a reality in today's society, as denounced by the study, and subsequent report, conducted by the Organización de las Naciones Unidas (2011) and other recent

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work on trans, gay, lesbian or bisexual (Beck et al., 2010; Dispenza et al., 2012; Dugan et al., 2012; Barrientos and Cárdenas, 2013; Kattari et al., 2018).

The school context is one of the areas where lesbians, gays, bisexuals, transgender, transsexuals, intersexes, queer and other sexual and gender minority people (LGBTIQ+) suffer most from exclusion and violence (Dugan et al., 2012; Martxueta and Etxeberria, 2014). In this sense, Sánchez Sibony et al. (2018), after a systematic review of studies on harassment and stigmatization in schools for reasons of sexual and gender diversity, determine the existence of a specific form of homophobic bullying. These experiences of bullying are associated with health problems such as depression, anxiety, low self-esteem, substance abuse, isolation, and even the risk of suicide (Birkett et al., 2009; Generelo et al., 2012). There is an urgent need to train educational professionals in the inclusion of this student body and in the prevention of these forms of violence and harassment (Kattari et al., 2018).

Similarly, situations of discrimination and asymmetry toward women are frequent. The most extreme manifestation is gender-based violence, constituting a global health problem that is reaching epidemic rates, as warned by the Organización Mundial de la Salud (2013). In Spain, in 2018, more than 160,000 complaints of gender violence were filed. That same year, 48 women were murdered by their partners or former partners. Scientific studies on this subject reveal the relationship between sexist beliefs and the legitimization of violence, sexual coercion, the use of verbal aggression, tolerance of sexual abuse or a tendency to rape (Forbes et al., 2005; Allen et al., 2009; Durán et al., 2010, 2014). Therefore, the main explanatory models of violence against women give importance to this type of attitude (Echeburúa and Fernández-Montalvo, 1998). Inequality also occurs in other spheres, such as the economy and the workplace. Organización Internacional de Trabajadores (2018) reports that women are responsible for 76.2% of unpaid care work worldwide. In our country, for example, the average hourly wage of women is 17% lower than that of men (Conde-Ruiz and Marra de Artichamo, 2016). All this leads to questioning the system that legitimizes the differential distribution of work and the different forms of violence against women, the so-called sex/gender system (Rubin, 1996).

The study of the attitudes that underpin the sex/gender system is essential for overcoming inequality, both for reasons of gender and for reasons of sexual diversity (Penna Tosso, 2015; Núñez Noriega, 2016). These attitudes are learned and developed throughout life, as a result of the process of socialization and gender pressure, and involve a willingness to engage in certain more or less inclusive or egalitarian behaviors. In this regard, Egan and Perry (2001) highlight the impact on children's personality, self-esteem and behavior of pressure for sex-typification from family, classmates or the media. As a result of such pressure, children anticipate evaluative reactions from others, and even from themselves, from gender-differentiated socialization schemes.

It should be recalled that Ajzen (1989, p. 245) defined attitude as "an evaluative disposition toward the object." Therefore, sexist attitudes can be highlighted, insofar as they imply a predisposition toward differential treatment of men and women.

These attitudes, called sexism, condition the way people relate and interact, since they determine what is appropriate and proper to be a man or a woman. Moya and Puertas (2004, p. 216) define sexism as "the set of attitudes about the roles and responsibilities considered appropriate for men and women, as well as the beliefs about relationships that members of both categories should have with each other." Although in practice sexist attitudes introduce this inequality, they do not always do so out of aversion or rejection. Thus, at present, one can distinguish both discrimination and opposition to women, as well as certain paternalistic and indulgent feelings toward them. In both cases, attitudes of undervaluation and prejudice based on sex are being generated and legitimized.

For all these reasons, Glick and Fiske (1996) consider that sexism is ambivalent, since sexist antipathy is mixed with certain positive feelings toward women. In ambivalent sexism there are, therefore, two differentiated and closely related dimensions, hostile sexism and benevolent sexism (Glick and Fiske, 1996, 2001; Expósito et al., 1998; Moya et al., 2006). The first, hostile sexism, is the most classic form of sexism, so it is also known as old-fashioned sexism or traditional sexism. Following the proposal of Glick and Fiske (1996), in the hostile sexism different components intervene: (a) *dominant paternalism*, characterized by the disdain and subordination of women; (b) *competitive gender differentiation*, based on the undervaluation of women's qualities, mainly for the public sphere; and (c) *heterosexual hostility*, focused on the "sexual power" of women, and the risks this causes in men. The second dimension, benevolent sexism, has a positive affective tone, leading to behaviors considered prosocial or intimacy seeking. In spite of the positive feelings that the preceptor may have, this dimension should be considered sexism, since in it lies the traditional male domination (Glick and Fiske, 1996; Expósito et al., 1998). Benevolent sexism is made up of three basic components: (a) *protective paternalism*, which sustains the vulnerability and weakness of women, and their need for protection; (b) *complementary gender differentiation*, which considers that women possess qualities and characteristics that are different from those of men, being necessary and positive; and (c) *heterosexual intimacy*, according to which, the emotional and sexual fullness of women depends on men.

The attitudes described above imply inequality and discrimination, since they attribute differential and/or complementary capacities and qualities to men and women. Furthermore, given their heteronormative nature, they hide, deny or reject other sexual and gender identities. In any case, in today's Western society the more traditional and hostile forms of sexism have diminished, with new and subtle forms of sexism taking their place. This makes that, a good part of the citizenship considers reached the equality and denies the existence of discrimination toward women (Expósito et al., 1998; García-Pérez et al., 2011; Martínez and Paterna-Bleda, 2013). This difficulty in identifying and perceiving sexism makes it resistant, and its eradication is more complex. In this sense, García-Pérez et al. (2011, p. 386) use the term "gender blindness" to refer to this inability to perceive inequality and discriminatory practices.

Heterosexism is similar to sexism in that it implies a disposition toward differential treatment based on the belief in the existence of a hierarchy between different sexual orientations. Underlying heterosexism is the belief that all people are heterosexual and that heterosexuality is more desirable than any other sexual choice. Homosexuality appears, at best, as incomplete, accidental, perverse and, at worst, as pathological, criminal, immoral and destructive of civilization (Borrillo, 2001). As with sexism, heterosexism favors the stigmatization, denigration or denial of any non-heterosexual option, legitimizing and justifying situations of discrimination and violence (Borrillo, 2001; Barón et al., 2013). Furthermore, it has been intimately linked to homophobia. This is defined by Penna Tosso and Sánchez Sáinz (2015, p. 84) as “behavioral, cognitive and/or affective hostility toward those who are supposed to desire or have sexual practices with individuals of their own sex.” For these authors, homophobia would also include the rejection of and discrimination against all sexual and gender identities that threaten the dominant hetero-patriarchal system. In this sense, Núñez Noriega (2016) recalls that the identities accepted and promoted by the sex/gender system need homophobia, since it allows them to delimit and maintain their contours and contents. Homophobia, therefore, supports the established social order and the construction of heterosexual man identity. It is not surprising, therefore, that men, especially in school, adopt homophobic behavior to get away from everything that could be associated with femininity (Blaya et al., 2007).

In the field of education, both sexism and heterosexism are verifiable. Androcentric values still persist among teachers (Anguita and Torrego, 2009). Moreover, this group, like the rest of the population, has difficulty detecting situations of inequality or discrimination against women and girls, and consequently, does not identify sexist teaching practices (Del Castillo and Corral, 2011; García-Pérez et al., 2011; Díaz de Greñu et al., 2013; Gómez-Jarabo and Sánchez, 2017). On the other hand, even today, school curricula and materials are masculinized, with a notable absence of woman models and references (Artal, 2009). The few women who are presented in the curriculum are characterized by victimized, masculinized or dubious social roles, reinforcing traditional and/or paternalistic sexist stereotypes (Molet and Bernad, 2015; Ortega-Sánchez and Pagès, 2016, 2018a). This lack of models extends to sexual and gender diversity (Vidiella, 2012). Unfortunately, little progress has been made in schools to overcome these issues (González Pérez, 2017; Cerdón et al., 2019), despite the good predisposition toward equality of teachers (Rebollo et al., 2011; Azorín Abellán, 2014; Piedra et al., 2014). This shows the need for teacher training in gender equality, sexual diversity and coeducation, in order to promote a critical view that serves to identify inequality and transform educational practice (Ortega-Sánchez and Pagès, 2018b, 2020). It is worth asking whether the initial training currently offered favors overcoming sexism and heterosexism. Therefore, this research focuses on studying the sexist attitudes and beliefs toward homosexuality of future Primary Education teachers and future teachers of Compulsory Secondary Education, Upper Secondary Education, Vocational Training and Language Teaching. For this purpose, a feminist perspective has been chosen, since, as

indicated by Penna Tosso (2015), Penna Tosso and Sánchez Sáinz (2015), and Núñez Noriega (2016), negative attitudes and rejection of homosexuality and other sexual identities are linked to sexism.

MATERIALS AND METHODS

As indicated above, the main objective of this research is to analyze the levels of sexism and prejudice against homosexuality in future primary education teachers and future teachers of Compulsory Secondary and Upper Secondary School Education, Vocational Training, Artistic Education and Languages, as well as to determine the possible differences in sustaining these attitudes according to sex or political ideology. To this end, six working hypotheses have been established, taking into account the nature of the attitudes evaluated (sexist or prejudiced toward homosexuality).

- H₁: Future teachers will still possess considerable levels of sexism, both hostile and benevolent.
- H₂: Men in the sample will maintain higher levels of sexism than their women colleagues.
- H₃: Students with more conservative ideological positions will score higher on measures of sexism (hostile and benevolent) than their peers with ideological positions more liberal or left-wing.
- H₄: Future teachers will have high levels of prejudice against homosexuality.
- H₅: Men in the sample will have higher levels of prejudice against homosexuality than their women peers.
- H₆: Students with more conservative or right-wing ideological positions will score higher on measures of prejudice against homosexuals than their more liberal ideological peers.

Sample

The sample of this research is made up of 452 students of the Degree in Primary Education Teacher and of the Master's Degree in Compulsory Secondary Education, Upper Secondary Education, Vocational Training and Language Teaching (MUPES) from three Spanish universities: University of Burgos (UBU), University of Murcia (UM) and University of Valladolid (UVa). The sample was of a non-probabilistic type for convenience (Hernández et al., 2010), attending to intentional criteria, fundamentally, the degree of adaptation of the sample to the research objectives. The participants in the study were between 19 and 58 years of age, with a mean age of 24.74 ($SD = 6.51$). With regard to the distribution by sex, the greater presence of females can be highlighted, since they represent 66.59% of the sample. In addition, 0.44% are intersex people. Regarding sexual orientation, most of the participants in the study are heterosexual (89.06%). On the other hand, 4.91% of the sample declared themselves to be homosexual and 4.24% bisexual. Likewise, 1.79% of those surveyed said they were asexual. With regard to the university training of the sample, 45.80% are enrolled in the Primary Education Teacher Degree,

TABLE 1 | Characteristics of the sample.

	Frequency	Percentage	<i>M</i>	<i>SD</i>
Sex (<i>n</i> = 452)				
Male	149	32.96		
Female	301	66.59		
Intersex	2	0.44		
Sexual orientation (<i>n</i> = 448)				
Asexual	8	1.79		
Homosexual	22	4.91		
Heterosexual	399	89.06		
Bisexual	19	4.24		
Degree (<i>n</i> = 452)				
Primary School Teacher	207	45.80		
Master in Teachers from Compulsory Secondary Education	244	53.98		
Other*	1	0.22		
University (<i>n</i> = 452)				
University of Burgos (UBU)	138	30.53		
University of Murcia (UM)	108	23.89		
University of Valladolid (UVa)	206	45.58		
Number of hours of training received				
NGT (<i>n</i> = 233)			21.26	27.65
NTC (<i>n</i> = 170)			25.05	45.15

*Others: Psychopedagogy. NGT: Number of hours of training received on gender equality. NTC: Number of hours of training received on pedagogical issues linked to co-education and the educational treatment gender equality in the classroom.

53.98% study the MUPES and only one subject has another teaching qualification. With respect to the universities in which they are studying, nearly half of the participants in the research come from the UVa (45.58%); followed by 30.53% of students from the UBU and 23.89% of students from the UM (Table 1).

The descriptive analysis of the training received on issues related to gender equality shows that this type of teaching is not widespread. Just over half of the respondents (56.54%) have received training related to these issues at some point (Table 1). Furthermore, the duration or extension of this training varies from less than 1 h to more than 180 h, and this great dispersion can be seen in the measures of central tendency (*M* = 22.01, *SD* = 27.65; *M_e* = 10.00 *M_o* = 60.00). On the other hand, in the pedagogical training itself (coeducation and approach to gender equality in the classroom), a greater lack of training is discovered. Only 36.67% of the student population surveyed has received this type of training, that is, more than 60% lack specific training to address equality and coeducation in the classroom. With respect to the duration of this pedagogical training, a great variability is again discovered with interventions that oscillate between 1 and 400 h. Again, the central tendency measures reflect this dispersion (*M* = 31.31, *SD* = 27.65; *M_e* = 14.50; *M_o* = 60.00).

Instrument

A questionnaire made up of two different blocks was used to collect information. The first of these includes questions on sociodemographic, ideological, religious and training aspects,

examining, for example, the number of hours of training received on gender equality or on pedagogical issues linked to co-education and the educational treatment gender equality in the classroom.

The second is made up of two standardized scales on attitudes: (a) the Ambivalent Sexism Inventory of (ASI) by Glick and Fiske (1996) validated in Spanish by Expósito et al. (1998), and (b) the Scale of Attitudes of Heterosexuals toward Homosexuals (HATH) by Larsen et al. (1980), translated into Spanish and validated by Barrientos and Cárdenas (2010) in a sample of Chilean university students.

The Spanish version of the ASI (Glick and Fiske, 1996; Expósito et al., 1998) consists of 22 items formulated in the same direction. It is a Likert-type scale with 6 answer options, ranging from 0 (totally disagree) to 5 (totally agree). It evaluates the level of ambivalent sexism of the participants, differentiating its main components: Hostile Sexism (HS) and Benevolent Sexism (BS). Regarding the internal consistency of the scale, Expósito et al. (1998) obtain very good reliability coefficients, both in the ASI (first study $\alpha = 0.88$ /second study $\alpha = 0.90$), and in the two subscales that make it up: HS (first study $\alpha = 0.87$ /second study $\alpha = 0.89$) and BS (first study $\alpha = 0.84$ /second study $\alpha = 0.86$). The reliability of this research results in significantly higher coefficients, indicating high internal consistency. The analysis of these parameters in the whole scale – ASI – shows an excellent internal consistency ($\alpha = 0.934$; $\Omega = 0.945$). In the case of HS, excellent reliability coefficients are also obtained ($\alpha = 0.934$; $\Omega = 0.946$). Finally, the BS coefficients indicate that this subscale also has a very good reliability ($\alpha = 0.849$; $\Omega = 0.890$).

The Spanish version of the HATH (Larsen et al., 1980; Barrientos and Cárdenas, 2010) is a 5-point Likert-type scale (from 1 = total disagreement to 5 = total agreement), which has 20 items and evaluates the presence of negative attitudes toward homosexuals. A high score on the scale indicates greater prejudice toward this social group (Barrientos and Cárdenas, 2010). The HATH in its original version presented an adequate internal consistency with $\alpha = 0.86$ (Larsen et al., 1980). Barrientos and Cárdenas (2010) obtained a Cronbach's Alpha of 0.90, which shows the excellent reliability of the scale in Spanish. In the present study, the reliability presented by HATH is similar, being very good ($\alpha = 0.891$) or excellent ($\Omega = 0.928$).

Procedure

A non-experimental quantitative research of a transversal and exploratory nature is chosen, with the purpose of knowing a set of variables (scales) through its “initial exploration at a specific time” (Hernández et al., 2010, p. 152). To this end, the instrument described in the previous section is used to collect information. The administration of the questionnaire is carried out in person and collectively in the different classrooms selected from the universities of Burgos, Valladolid and Murcia, recalling the voluntary and anonymous nature of the participation in the study.

After the data collection procedure, the data are computerized and coded in a database. For this task, together with the analysis, the IBM SPSS Statistics 25 statistical package is used. For the study of the size of the effect of the results

extracted, the free software G*Power in version 3.1.9.4. is used, in accordance with the recommendations for its use from Cárdenas and Arancibia (2014).

Data Analysis

Tests for two or more independent samples and correlations have been used primarily. Parametric statistics are used because of its robustness (Marôco, 2009), “even when the distributions under study have a considerable bias and/or flattening” (Barreira, 2008, p. 170). According to the central boundary theorem, “the larger the sample, the greater the probability that the mean distributions of the variables involved will be normally distributed, even if, individually, they do not have a normal distribution. Therefore, increasing the sample size [as done in this study] reduces the effects of variable non-normality, which increases the robustness of the analysis and makes the transformation of these variables less necessary” (Barreira, 2008, p. 171). Therefore, the following tests are applied: the t Student test, the analysis of variance with ANOVA and *post hoc* contrasts using the Bonferroni test, and Pearson’s correlations. In addition, the justification for the specific use of the ANOVA, a natural extension of the Student *t*, lies in the optimum and moderate robustness of the test in the face of non-compliance with the assumptions of normality and homocedasticity, respectively. This robustness has been demonstrated, moreover, by checking the limitation of the impact of non-compliance with the assumption of normality on the type I error rate (Finch, 2005). It should be noted that Bonferroni’s test assumes homocedasticity of variance, which is difficult to meet in all the groupings proposed in the analysis. However, it is applied assuming the assumptions of planned, simple and complex hypotheses, and understanding that its restrictive character to locate differences gives more value to the results.

The measures proposed by Cohen (1988) are used to study the size of the effect of the results obtained. In the case of the Student *t*-tests, Cohen’s *d* has been calculated. Cohen’s *f* has been applied to the unifactorial ANOVAs, and Cohen’s *d* has also been used in the *post hoc* contrasts with Bonferroni, since they are based on Student’s *t*.

RESULTS

Ambivalent Sexism: Hostile Sexism and Benevolent Sexism

This study found low levels of ambivalent ($M = 0.85, SD = 0.81$), hostile ($M = 0.93, SD = 1.01$), and benevolent ($M = 0.77, SD = 0.77$) among study participants.

The application of the Student *t*-Test to the ASI scores and its two subscales BS and HS reveals statistically significant differences ($p = 0.000$) according to gender (Table 2). Men obtain higher scores on BS ($M = 1.06, SD = 0.92$) than women ($M = 0.62, SD = 0.63$). Although statistically significant differences are found ($p = 0.000$), given the dispersion in scores, a moderate effect size is obtained ($d = 0.59$). A similar situation is found in HS, where men obtain higher scores ($M = 1.35, SD = 1.21$) than women ($M = 0.72, SD = 0.81$). Here again, highly significant differences ($p = 0.000$) and moderate effect size ($d = 0.66$), although slightly

TABLE 2 | Comparison of scores in BS, HS, and ASI according to gender.

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>gf</i>	<i>p</i>	<i>d</i>
Benevolent Sexism – BS						
Man (<i>n</i> = 149)	1.06	0.92	5.18	217.46	0.000**	0.59
Woman (<i>n</i> = 301)	0.62	0.63				
Hostile Sexism – HS						
Man (<i>n</i> = 149)	1.35	1.21	5.77	216.04	0.000**	0.66
Woman (<i>n</i> = 301)	0.72	0.81				
Ambivalent Sexism – ASI						
Man (<i>n</i> = 149)	1.20	0.98	6.00	212.54	0.000**	0.69
Woman (<i>n</i> = 301)	0.67	0.64				

** $p < 0.01$.

higher than BS, are found. In line with the above, similar results are obtained for the whole scale. A comparison of the ASI scores for men ($M = 1.20, SD = 0.98$) and women ($M = 0.67, SD = 0.64$), reveals significant differences ($p = 0.000$) with a slightly larger, but moderate effect size ($d = 0.69$). The study of the effect size reveals that the differences found are statistically significant, but with moderate potency. This highlights the unstable and generalizable nature of the differences found on the basis of sex in sexist attitudes, showing the possibility of reducing these differences through education, for example.

The scores obtained in BS, HS, and ASI in different groups have been compared according to the political ideology of the research participants. The results obtained with the ANOVA show that there are significant differences depending on the ideology (Table 3). Significant differences are observed in BS, HS and ASI ($p < 0.01$), with an acceptable effect size in BS ($f = 0.35$) and high in HS ($f = 0.58$) and ASI ($f = 0.58$). In line with the effect size study, the *post hoc* contrast analysis using the Bonferroni test shows differences between the various ideological groups: extreme left (G1), left-wing (G2), center-left (G3), center (G4), center-right (G5), right-wing (G6) and extreme right (G7). As can be seen in Table 4, a positive trend is detected as we go through the ideological range in HS and ASI, that is, hostile and ambivalent sexist attitudes increase as ideological positioning becomes more conservative. In the case of the BS, given its subtle nature, although variations are detected in the sequence, a positive trend is also observed. In this case, the extreme left group holds a slightly higher level of benevolent or paternalistic sexist attitudes than the left group. The same is true between the center-left people and the center people, with the latter having lower levels of this type of sexism.

As can be seen in Table 4, the comparison of ideological groups in the BS reveals highly significant differences ($p < 0.01$) between people who declare themselves to be extreme left ($M = 0.53, SD = 0.50$) and people in the center-right ($M = 1.13, SD = 0.76$), right-wing ($M = 1.41, SD = 0.86$), and extreme right ($M = 3.36, SD = 1.86$). In all cases, with a high effect size ($d > 0.80$): extreme left and center-right ($d = -0.87$), extreme left and right ($d = -1.34$), and extreme left and extreme right ($d = -2.36$).

The scores obtained in BS by the G2 ($M = 0.49, SD = 0.51$) are lower than the rest of the groups. Consequently, people in G3

TABLE 3 | ANOVA Comparison of scores in BS, HS and ASI according to political ideology.

	n	BS					HS					ASI				
		M	SD	F	p	f	M	SD	F	p	f	M	SD	F	p	f
Extreme left	25	0.53	0.50	15.93	0.000**	0.35	0.29	0.29	23.90	0.000**	0.58	0.42	0.34	24.94	0.000**	0.58
Left-wing	136	0.49	0.51				0.47	0.69				0.48	0.53			
Center-left	83	0.82	0.74				0.97	0.89				0.90	0.76			
Center	99	0.77	0.77				1.10	0.94				0.93	0.77			
Center-right	56	1.13	0.76				1.57	1.12				1.35	0.84			
Right-wing	15	1.41	0.86				1.75	1.28				1.59	0.87			
Extreme right	3	3.36	1.86				4.27	0.45				3.81	0.78			

***p* < 0.01.

TABLE 4 | Comparison and *post hoc* contrasts using Bonferroni's test of BS, HS, and ASI scores according to declared ideology.

	n	M	SD	Bonferroni											
				G1		G2		G3		G4		G5		G6	
				p	d	p	d	p	d	p	d	p	d	p	d
BS															
Extreme left (G1)	25	0.53	0.50												
Left-wing (G2)	136	0.49	0.51												
Center-left (G3)	83	0.82	0.74			0.017*	-0.54								
Center (G4)	99	0.77	0.77												
Center-right (G5)	56	1.13	0.76	0.008**	-0.87	0.000**	-1.08		0.038*	-0.47					
Right-wing (G6)	15	1.41	0.86	0.002**	-1.34	0.000**	-1.67	0.049*	-0.78	0.016*	-0.82				
Extreme right (G7)	3	3.36	1.86	0.000**	-2.36	0.000**	-5.18	0.000**	-3.24	0.000**	-3.21	0.000**	-2.71	0.000**	-1.88
HS															
Extreme left (G1)	25	0.29	0.29												
Left-wing (G2)	136	0.47	0.69												
Center-left (G3)	83	0.97	0.89	0.016*	-0.75	0.001**	-0.65								
Center (G4)	99	1.10	0.94	0.001**	-0.95	0.000**	-0.78								
Center-right (G5)	56	1.57	1.12	0.000**	-1.35	0.000**	-1.31	0.002**	-0.61	0.034*	-0.47				
Right-wing (G6)	15	1.75	1.28	0.000**	-1.80	0.000**	-1.67	0.027*	-0.82						
Extreme right (G7)	3	4.27	0.45	0.000**	-13.04	0.000**	-5.53	0.000**	-4.84	0.000**	-3.59	0.000**	-2.45	0.000**	-2.09
ASI															
Extreme left (G1)	25	0.42	0.34												
Left-wing (G2)	136	0.48	0.53												
Center-left (G3)	83	0.90	0.76			0.001**	-0.67								
Center (G4)	99	0.93	0.77	0.020*	-0.72	0.000**	-0.70								
Center-right (G5)	56	1.35	0.84	0.000**	-1.28	0.000**	-1.37	0.004**	-0.57	0.009**	-0.53				
Right-wing (G6)	15	1.59	0.87	0.000**	-1.97	0.000**	-1.95	0.009**	-0.89	0.016*	-0.84				
Extreme right (G7)	3	3.81	0.78	0.000**	-8.65	0.000**	-6.23	0.000**	-3.83	0.000**	-3.74	0.000**	-2.94	0.000**	-2.58

p* < 0.05, *p* < 0.01.

score higher on the scale (*M* = 0.82; *SD* = 0.74), with significant differences between G2 and G3 (*p* = 0.017). In this case, in addition to a lower significance (*p* < 0.05), a moderate effect size is found (*d* = -0.54). More conclusive are the results obtained in the comparison of G2 with people from G5 (*M* = 1.13; *SD* = 0.76), G6 (*M* = 1.41, *SD* = 0.86) and G7 (*M* = 3.36, *SD* = 1.86), in all three cases statistically significant differences are found (*p* < 0.01) and a high effect size (*d* > 0.80) (Table 4).

The Bonferroni test finds statistically significant differences (*p* = 0.049) in BS between center-left and right people. In this case,

although the significance is lower, a high effect size (*d* = -0.78) appears to confirm these differences. In line with these results, G3 people also differ significantly (*p* = 0.000) in sustaining BS from extreme right people, with a very high effect size (*d* = -3.24).

Post hoc contrasts locate differences between the G4 and groups with more conservative ideologies: G5 (*M* = 1.13; *SD* = 0.76), G6 (*M* = 1.41, *SD* = 0.86), and G7 (*M* = 3.36, *SD* = 1.86). In the first case, comparison of G4 and G5, the differences are significant (*p* < 0.05) but with an insufficient effect size (*d* = -0.47). However, between G4 and G6, statistical

differences are found ($p < 0.05$) with a high effect size ($d = -0.82$), which shows the power of these differences. Coincidentally, the comparison of G4 and G7 reveals differences of high size and significance ($p = 0.000$; $d = -3.21$). Finally, and as can be seen in **Table 4**, people on the extreme right have higher levels of BS, with statistically significant differences with the rest of the groups ($p = 0.000$), with a high effect size in all of them ($d > 0.80$).

With respect to the HS, the situation is similar to that obtained in the BS. The comparison of ideological groups in HS reveals significant differences ($p = 0.016$) between people who declare themselves to be extreme left ($M = 0.29$, $SD = 0.29$), with people in the center-left ($M = 0.47$, $SD = 0.69$), with an adequate effect size ($d = -0.75$). The power of these results is evident. The differences are more pronounced ($p < 0.01$), if we compare the HS manifested by the persons in G1 with that sustained by people included in G4 ($M = 1.10$, $SD = 0.94$), centre-right ($M = 1.57$, $SD = 1.12$), right ($M = 1.75$, $SD = 1.28$), and extreme right ($M = 4.27$, $SD = 0.45$). In all cases, with a high size of the effect ($d > 0.80$), it can be considered that the differences found in HS, between people on the extreme left (G1) and people who are in moderation (center-left or center) or in the ideological right-wing fork (center-right to extreme right) are stable and generalizable.

The scores obtained in the HS by the G2 ($M = 0.47$, $SD = 0.89$) are lower than those found in the groups G3, G4, G5, G6, and G7, appearing highly significant differences in all cases ($p < 0.01$). The effect size study shows a moderate impact in the comparison with G3 ($d = -0.65$) and G4 ($d = -0.78$), as well as a high effect with the rest of the groups ($d > 0.80$).

The same tendency is discovered in the comparison of the HS held by the center-left and the adhesion to this type of sexism by other groups located in the ideological range of the right. In this sense, statistically significant differences are found with center-right people ($p = 0.001$), although with a moderate effect size ($d = -0.61$). More notable are the differences found with people from the right ($p = 0.027$, $d = -0.82$), and extreme right ($p = 0.000$, $d = -4.04$), since they present a high statistical power.

Comparison of the G4 ($M = 1.10$, $SD = 0.94$) with the rest of the groups finds significant differences ($p = 0.034$) with the center-right persons ($M = 1.57$, $SD = 1.12$), but with an insufficient effect size ($d = -0.47$). Statistical differences ($p = 0.000$) are also found between G4 and G7. In this case, extreme right have higher levels of traditional sexism ($M = 4.27$, $SD = 0.45$), with a high effect size ($d = -0.359$). As in BS, extreme right have clearly higher levels of HS than the rest of the groups, with statistically significant differences ($p = 0.000$), with a high effect size in all of them ($d > 0.80$).

The ASI comparative study between ideological groups shows statistical differences between the G1 ($M = 0.42$, $SD = 0.34$) and the groups: G4 ($M = 0.93$, $SD = 0.77$), G5 ($M = 1.35$, $SD = 0.84$), G6 ($M = 1.59$, $SD = 0.87$), and G7 ($M = 3.81$, $SD = 0.78$). In the first case, comparison of G1 and G4, minor differences are found ($p = 0.020$) with a reasonable effect size since it is close to 0.80 ($d = -0.72$). In the remaining cases, highly significant differences ($p = 0.000$) and a high effect size ($d > 0.80$) are found. It can therefore be considered that the differences found in the levels of ambivalent sexism between people on the extreme left (G1)

and people on the ideological right (from the center-right to the extreme right) are stable and generalizable.

The scores obtained in the ASI by the G2 ($M = 0.48$, $SD = 0.53$), although higher than those of the G1, are lower than the rest of the groups. Consequently, people from the G3 score higher on the scale ($M = 0.90$; $SD = 0.76$), with significant differences appearing between the G2 and G3 ($p = 0.001$), although with a moderate effect size ($d = -0.67$). A similar situation is found between G2 and G4, with statistical differences ($p = 0.000$) and an average effect size ($d = -0.70$). In contrast, the results obtained in the comparison of G2 with people in G5 ($M = 1.35$, $SD = 0.84$), G6 ($M = 1.59$, $SD = 0.87$), and G7 ($M = 3.81$, $SD = 0.78$) are conclusive. In all three cases, statistically significant differences ($p = 0.000$) and a high effect size ($d > 0.80$) are found. In this case, it is also possible to affirm that the differences found in the levels of ambivalent sexism, between people of the left and people who are located in the ideological sphere of the right (from the center-right to the extreme right) are stable and generalizable.

Groups composed of center-left (G3) and center (G4) people sustain lower levels of ambivalent sexism than center-right, right-wing and extreme right people. The differences found in both groups with G5, are highly significant ($p < 0.01$) but with medium effect size ($d < -0.60$), that is, they are not extrapolated to the population. On the other hand, the differences of G3 with G6 and G7, are very powerful with high values of significance ($p = 0.000$) and size of the effect ($d > -0.80$). Similar results are found between G4 and G6, although with lower significance ($p = 0.016$) and similar effect size ($d = -0.84$). More potent are the differences found between G4 and G7, given that extreme right maintain high levels of ambivalent sexism, with statistically significant differences found with all groups ($p = 0.000$), with a large effect size in all of them ($d > 0.80$). It can be stated, despite the small number of extreme right people in the sample, that people of this extreme ideology possess high or excessive levels of sexism in all the variants studied: benevolent, hostile or ambivalent.

Attitudes Toward Homosexuality

In the case of attitudes toward homosexual people, the scores obtained in the HATH show a positive attitude of the sample toward these people ($M = 1.30$, $SD = 0.40$). A comparison of the HATH scores of men ($M = 1.43$, $SD = 0.57$) and women ($M = 1.23$, $SD = 0.25$) using the Student *t-test* reveals statistically significant differences between the two groups ($p = 0.000$), with men obtaining higher scores on the scale, i.e., those with more negative and prejudiced attitudes toward homosexuals. However, the study of the effect size of these differences shows a moderate size ($d = -0.52$) (**Table 5**).

TABLE 5 | Comparison of HATH scores by sex.

	<i>M</i>	<i>SD</i>	<i>t</i>	<i>gI</i>	<i>p</i>	<i>d</i>
Man (<i>n</i> = 149)	1.43	0.57	4.01	175.63	0.000**	0.52
Woman (<i>n</i> = 301)	1.23	0.25				

** $p < 0.01$.

Given the potential importance of the beliefs and values held by the sample, the HATH scores of different groups are analyzed comparatively according to the ideology of the research participants. To do this, the analysis of variance is performed with ANOVA and *post hoc* contrasts using the Bonferroni test. The results reveal statistically significant differences ($p = 0.000$) depending on political ideology, with a high effect size ($f = 0.79$) (Table 6).

As can be seen in Table 7, a positive trend is detected as we move through the ideological spectrum, i.e., prejudiced attitudes toward homosexuals increase as ideological positioning becomes more conservative. Therefore, people who declare themselves to be extreme left obtain lower scores in the HATH ($M = 1.18$, $SD = 0.15$) than people in the center-right ($M = 1.43$, $SD = 0.39$), right-wing ($M = 1.55$, $SD = 0.58$), and extreme right ($M = 4.57$, $SD = 0.55$), with statistically significant differences ($p < 0.01$). The study of the effect size of these differences between groups reveals an adequate or high effect size: extreme left and center-right ($d = -0.74$), extreme left and right-wing ($d = -1.00$) and extreme left and extreme right ($d = -16.15$).

The results found in the comparison of the G2 with the rest of the groups, show statistically significant differences with all the groups that are not in the ideological left range. The scores obtained in the HATH by the G2 ($M = 1.18$, $SD = 0.20$) are lower than those shown by the G4 ($M = 1.30$, $SD = 0.26$), significant differences appearing ($p = 0.023$). In this case, a moderate effect size is found ($d = -0.53$); which shows that these

differences cannot be generalized. A similar situation is found in the comparison of G2 with G5 (center-right people). In this case, the scores are higher ($M = 1.43$, $SD = 0.39$), as well as the significance of the differences found and the size of the effect ($p = 0.000$, $d = -0.93$). In line with these results, the comparison of the G2 with the G6 scores ($M = 1.55$, $SD = 0.58$), also finds statistically significant differences ($p = 0.000$) with a high effect size ($d = -1.42$). Finally, the comparison between G2 and G7 ($M = 4.57$, $SD = 0.55$) reveals statistically significant differences ($p = 0.000$) with a high effect size ($d > 0.80$) (Table 7).

The comparative analysis also finds statistically significant differences ($p < 0.05$) between center-left (G3) people ($M = 1.28$, $SD = 0.26$) and right-wing (G6) and extreme right (G7) people. In the first case, there are differences with less significance ($p = 0.017$) but with high effect size ($d = -0.83$), evidencing the strength of these differences. In the second case, comparison of G3 and G7 reveals highly significant differences ($p = 0.000$) with a strong effect size ($d = -12.16$). Once again, the differences in the HATH scores between the left positions, in this case moderate approaches, and the clearly right positions are reflected.

As in the center-left group, statistically significant differences ($p < 0.05$) were found between people in the center and those on the right-wing or extreme right, with a high effect size in both cases ($d > 0.80$).

Finally, as can also be seen in Table 7, it is the G7 who score high on the HATH ($M = 4.57$, $SD = 0.55$), with differences of more than 3 points with the other groups. Therefore, highly significant differences have been found ($p = 0.000$), not only with the groups of the left or moderate ideological range, but, with the rest of the right groups, with a high size of the effect in all of them ($d > 0.80$).

TABLE 6 | ANOVA Comparison of HATH scores according to political ideology.

	<i>n</i>	<i>M</i>	<i>SD</i>	<i>F</i>	<i>p</i>	<i>f</i>
Extreme left	25	1.18	0.15	76.88	0.000**	0.79
Left-wing	136	1.18	0.20			
Center-left	83	1.28	0.26			
Center	99	1.30	0.26			
Center-right	56	1.43	0.39			
Right-wing	15	1.55	0.58			
Extreme right	3	4.57	0.55			

** $p < 0.01$.

Relationship Between Variables

The results obtained show the existence of a positive, although moderate, correlation between the number of hours of training received on gender equality, and the number of hours of training received on pedagogical issues linked to co-education and the educational treatment gender equality in the classroom ($r = 0.527$, $p = 0.000$) (Table 8).

It also confirms the existence of an acceptable, though moderate, degree of correlation between HATH and different

TABLE 7 | Comparison and *post hoc* contrasts using Bonferroni's test on HATH scores according to declared ideology.

	<i>n</i>	<i>M</i>	<i>SD</i>	Bonferroni											
				G1		G2		G3		G4		G5		G6	
				<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>	<i>p</i>	<i>d</i>
Extreme left (G1)	25	1.18	0.15												
Left-wing (G2)	136	1.18	0.20												
Center-left (G3)	83	1.28	0.26												
Center (G4)	99	1.30	0.26			0.023*	-0.53								
Center-right (G5)	56	1.43	0.39	0.005**	-0.74	0.000**	-0.93								
Right-wing (G6)	15	1.55	0.58	0.002**	-1.00	0.000**	-1.42	0.017*	-0.83	0.030*	-0.79				
Extreme right (G7)	3	4.57	0.55	0.000**	-16.15	0.000**	-16.19	0.000**	-12.16	0.000**	-12.16	0.000**	-7.92	0.000**	-5.24

* $p < 0.05$, ** $p < 0.01$.

TABLE 8 | Pearson's correlations between the variables age, training hours about gender and coeducation, and the HATH, BS, HS, and ASI scales.

	Age	NGT	NTC	HATH	BS	HS	ASI
Age	1						
NGT	0.076	1					
NTC	-0.039	0.527**	1				
HATH	-0.040	0.111	-0.117	1			
BS	0.043	0.096	-0.044	0.472**	1		
HS	0.029	-0.001	-0.040	0.506**	0.681**	1	
ASI	0.038	0.044	-0.045	0.535**	0.891**	0.939**	1

* $p < 0.01$. NGT, number of hours of training received on gender equality. NTC, number of hours of training received on pedagogical issues linked to co-education and the educational treatment gender equality in the classroom.

forms of sexism. In this sense, the correlation found between HATH and BS is slightly lower ($r = 0.472$, $p = 0.000$). On the other hand, the results obtained between HATH and HS ($r = 0.506$, $p = 0.000$) and between HATH and ASI ($r = 0.535$, $p = 0.000$), show a greater interdependence between the variables. It can be considered with nuances that prejudiced attitudes toward homosexual people are positively related to classic and ambivalent sexist attitudes.

Similarly, and as might be expected, there are more consistent correlations between the three types of sexism. Thus, between BS and HS there is a positive and consistent correlation ($r = 0.681$, $p = 0.000$), being more powerful between BS and ASI ($r = 0.891$, $p = 0.000$). Finally, the correlation is extreme and almost perfect between HS and ASI ($r = 0.939$, $p = 0.000$), which may suggest the use of the HS subscale alone. In any case, the clear relationship and interconnection of the different types of sexism is evident, as pointed out by Expósito et al. (1998).

DISCUSSION

Non-sexist and non-judgmental attitudes toward homosexual persons are a key aspect of achieving equality and eradicating violence, as detailed extensively in the introduction. In this sense, the future teachers studied present a very low level of ambivalent sexism, an aspect that should be highlighted as it contrasts with the first of the hypotheses and with previous research carried out with the same instrument in similar populations (Cárdenas et al., 2010; Rodríguez-Otero and Treviño, 2017; Scandurra et al., 2017; Kuchynka et al., 2018; Bochicchio et al., 2019; Carretero and Nolasco, 2019; Córdón et al., 2019). Likewise, other studies conducted in the educational context, with diverse scientific methodologies, reveal both significant and high levels of sexism, as well as difficulties in identifying situations of gender inequality and androcentric teaching practices (Del Castillo and Corral, 2011; García-Pérez et al., 2011; Díaz de Greñu et al., 2013; Gómez-Jarabo and Sánchez, 2017). Various works indicate that the predisposition toward equality and the attitude of teachers is good in general, but difficulties still appear at the relational level or in educational practice itself (Rebollo et al., 2011; Azorín Abellán, 2014; Piedra et al., 2014). These studies show that “gender blindness” is the main obstacle to coeducation, since there is still great difficulty in identifying and

overcoming specific situations of inequality (García-Pérez et al., 2011; Piedra et al., 2014).

As noted above, the students surveyed had low levels of ambivalent sexism, with the level of hostile or traditional sexism being slightly higher. In contrast, Carretero and Nolasco (2019), in a sample of 1,308 students of teaching in Castilla-La Mancha (Spain), find higher levels of sexism than those found in the present study. In addition, they discover a greater presence of benevolent sexism. Coinciding with their results, the research carried out in Extremadura (Spain) by Córdón et al. (2019), with 1,296 students of the Teacher Training Degree in Primary Education, also reveals higher rates of ambivalent sexism (hostile and benevolent), with higher scores in benevolent sexism. On the other hand, Scandurra et al. (2017) find higher levels of sexism than those discovered in the present research in a sample of 438 Italian teachers. Similar findings were made by Cárdenas et al. (2010) in a sample of 220 Chilean university students from various degrees such as Psychology, Engineering, Journalism and Economics. In their case, there were higher levels of ambivalent sexism than those found in this study and a higher incidence of benevolent sexism. For its part, research conducted in Mexico by Rodríguez-Otero and Treviño (2017) finds higher levels of hostile sexism than benevolent sexism in students of Social Work. However, the overall levels of sexism are high, that is, it is a typified and stereotyped group, which leads to a greater presence of the old sexism (Expósito et al., 1998; Moya et al., 2006). The present work not only refers to reduced levels of sexism among future teachers, but also suggests a trend toward resistance to hostile sexism and the equation of both components of ambivalent sexism. This trend can also be seen in the study carried out by Jiménez-García-Bóveda et al. (2014) with 945 mental health professionals in Andalusia. In their case, minimum levels of sexism are discovered and the trend of balance between the two forms of sexism: hostile and benevolent is evident.

As in previous research (Cárdenas et al., 2010; Jiménez-García-Bóveda et al., 2014; Rodríguez-Otero and Treviño, 2017; Scandurra et al., 2017; Kuchynka et al., 2018; Carretero and Nolasco, 2019; Córdón et al., 2019), the results obtained in this research show that men have higher levels of ambivalent sexism (hostile and benevolent) than women, confirming the second hypothesis. The sex variable is relevant in sustaining sexist attitudes, with men having the highest levels of hostile and benevolent sexism. In line with this, research that includes

aspects related to sexism such as gender ideology, stereotypes or the double sexual role confirms the greater adherence of men to this type of belief (Heras and Lara, 2009; Clow et al., 2014; Piedra et al., 2014).

With regard to the detailed analysis of the incidence of the two components of ambivalent sexism, as expected, the men studied maintain higher levels of classical sexism, coinciding with the findings of previous research (Carretero and Nolasco, 2019; Cordón et al., 2019; Rodríguez-Otero and Treviño, 2017). However, recent work by Jiménez-García-Bóveda et al. (2014), with Andalusian health workers, finds similar, almost identical levels of hostile and benevolent sexism in men, with the latter being slightly higher. Similarly, Cárdenas et al. (2010) find a greater prevalence of benevolent sexism in the students surveyed, although no major differences are observed between the two components. It can be concluded, therefore, that men have a greater predisposition toward classical forms of sexism. In the case of women, the results obtained contrast with most previous research, since they score higher on the hostile component of sexism. Only the work of Rodríguez-Otero and Treviño (2017), carried out with students in Mexico, shows this women tendency toward traditional sexism. In the present study, however, the adherence of future women teachers to both types of sexism is very low and similar. In this sense, Jiménez-García-Bóveda et al. (2014) found identical scores in hostile and benevolent sexism among the professionals studied. In contrast, the rest of the research consulted detects higher levels of benevolent sexism in women and, consequently, lower levels of hostile sexism (Cárdenas et al., 2010; Carretero and Nolasco, 2019; Cordón et al., 2019). It can be considered that women tend to be more critical of the old sexism, as members of the discriminated groups, in this case women, are more likely to explain the facts as a result of such discrimination (Quiles et al., 2003). On the contrary, given the affective and subtle nature of benevolent sexism, it is easier for women not to identify it as discriminatory, and consequently to sustain it to a greater degree. Therefore, as sexism is structurally overcome and gender awareness is generated, the “gender blindness” decreases; the subtler aspects of sexism begin to be perceived. It is not surprising, therefore, that studies revealing very low levels of sexism, in men and women, show almost identical measures in both components: hostile and benevolent.

With regard to political ideology, several studies show that the most conservative ideological approaches are related to prejudiced attitudes toward groups that are considered inferior or subordinate (Cohrs and Ibler, 2009; Rottenbacher, 2010, 2012; Rottenbacher et al., 2011; Scandurra et al., 2017). Accordingly, the results obtained in this study reveal that political ideology, understood as a continuum from the left to the right, is a determining variable in sustaining sexist attitudes (hostile, benevolent and ambivalent), confirming the third hypothesis under study. People with left-wing ideological approaches have more egalitarian and less sexist attitudes than those who position themselves in the right-wing ideological fork. Moreover, there is an upward trend in adherence to sexism in all its dimensions as the ideological approach becomes more conservative; the small extreme right group has disturbing levels of ambivalent, hostile

and benevolent sexism. Similar results are found by Rottenbacher (2010) and Rottenbacher et al. (2011) applying a standardized scale of right-wing authoritarianism. Both of these studies find positive correlations between conservatism and sexism in all its dimensions, evidencing the upward trend described above. Furthermore, as in the present research, Scandurra et al. (2017) find highly significant differences with a high effect size between Italian teachers who define themselves as conservative and those who call themselves moderate or progressive. In contrast, the study by Cárdenas et al. (2010), although it finds a higher level of hostile sexism in right-wing people, does not detect the same circumstance in benevolent sexism. It is the people who position themselves in the ideological center who show the greatest adherence to this component of sexism (BS). The results of this research, and of previous work, suggest that conservative or right-wing political ideology is strongly related to sexism and prejudice against women. Some authors even propose predictive models in this sense (Rottenbacher, 2010; Rottenbacher et al., 2011). However, sexism has a marked socio-cultural character and structures, and therefore is present in all classes, spheres and social sectors.

In relation to attitudes toward homosexuals, as indicated by Pérez-Testor et al. (2010), few studies address this issue in teachers, with slightly more frequent research with students from the Faculties of Education: future teachers, social educators, pedagogues and teachers of secondary, high school, professional training or language teaching (Piedra et al., 2013; Penna Tosso and Mateos Casado, 2014; Penna Tosso, 2015; Penna Tosso and Sánchez Sáinz, 2015; Robles-Reina et al., 2017).

As opposed to the fourth hypothesis, the present study reveals a low level of negative attitudes toward homosexuality among the students surveyed. These results coincide with those obtained by Penna Tosso and Sánchez Sáinz (2015) in a sample of 214 students of the Master in Teachers from Compulsory Secondary Education and Bachiller, Vocational Training and Language Teaching, where they found reduced levels of behavioral homophobia and normalization of homophobic violence, as well as low maintenance of cognitive and affective homophobia. Scandurra et al. (2017) found similar, though slightly higher, levels of homophobia in a sample of 438 practicing teachers. These findings, and those found in the present study, contrast with the results obtained in similar research conducted in our context or abroad. In Italy, Baiocco et al. (2019) found higher levels of prejudice toward homosexuality in a sample of 323 teachers and educators in nurseries, kindergartens and primary schools. In Melilla, Robles-Reina et al. (2017) found a high level of prejudice toward homosexual persons in a sample of 170 students in the Infant Education, Primary Education, Social Education and Business Sciences Grades. For their part, Penna Tosso and Mateos Casado (2014) found, in a large sample of Ecuadorian student teachers ($n = 1729$), a greater proportion of future teachers who presented cognitive and affective homophobia, showing negative attitudes toward homosexuality. However, the same study found that these attitudes do not materialize in behavioral homophobia or fear of stigmatization, with moderate or low rates in these subscales. It can therefore be stated that the future teachers studied have lower levels of prejudice toward

homosexuals than those found in other research. In this sense, work with other population groups confirms that the attitudes found in this research are appropriate, and even positive. For example, the research carried out with the same scale by Cárdenas and Barrientos (2008), with Chilean university students, where they obtained higher scores than those found in the present study, can be highlighted.

As in previous research, the results obtained in this study show that men hold higher levels of negative attitudes toward homosexuality than women (Cárdenas and Barrientos, 2008; Penna Tosso, 2015; Lopez and Taype-Rondán, 2017; Robles-Reina et al., 2017; Scandurra et al., 2017), confirming the fifth hypothesis under study. The study by Robles-Reina et al. (2017) reveals the existence of gender differences in both the level of prejudice and the social distance between gays and lesbians. Future women teachers and social educators have more favorable attitudes toward homosexuality, and low levels of distancing with LGBT people. On the contrary, men appear to have higher levels of prejudice and social distancing, which may make it difficult to exercise their future profession with this group. Similar conclusions can be drawn from the meta-study carried out by Penna Tosso (2015) with a sample of more than twenty-five investigations with diverse populations. In most of them, the sex variable is a determining factor in the maintenance of prejudices toward homosexuals, with men having higher levels of homophobia, heterosexism or other negative attitudes toward homosexuality. Using the same scale, Cárdenas and Barrientos (2008) also found differences between woman university students and their man colleagues, with the latter obtaining higher scores on the scale. On the other hand, the study of Scandurra et al. (2017), carried out with Italian teachers, discovers higher levels of prejudice toward sexual minorities in men, finding important differences in both homophobia and transphobia measures. In summary, the results of this research support the existence of a greater disposition to negative attitudes toward homosexuality in men, an aspect linked to the construction of hegemonic masculinities and the maintenance of the sex/gender system (Blaya et al., 2007; Penna Tosso and Sánchez Sáinz, 2015; Núñez Noriega, 2016).

In relation to political ideology, as already indicated, the most conservative positions are related to more hostile or prejudiced attitudes toward groups that are considered inferior, minority or that attempt, or are perceived to attempt, the predominant *status quo* (Cohrs and Ibler, 2009; Rottenbacher, 2010, 2012; Rottenbacher et al., 2011). In this research, political ideology has been shown to be a determining variable in sustaining negative attitudes toward homosexuality, as reflected in the sixth and final working hypothesis. People with left-wing ideological views have more tolerant and positive attitudes toward homosexuality than those in the right-wing ideological bracket. In addition, there is a clear upward trend in the level of prejudice against homosexual people, as the ideological approach becomes more conservative. Again, the extreme right group possesses alarming levels of hostility and prejudice. This finding not only highlights the low acceptance of sexual diversity in this group, but reinforces the concern expressed by several authors about extreme right movements (Bartual-Figueras et al., 2018; López, 2018). Other

similar works with university students and graduates also find in people with conservative or right-wing ideologies a greater predisposition to prejudice, rejection or limitation of the rights of homosexuals (Smith-Castro and Molina-Delgado, 2011; Rottenbacher, 2012). In this sense, various works carried out with practicing teachers and/or educators discover similar results, with prejudice being greater among the most conservative people (Scandurra et al., 2017; Baiocco et al., 2019). In contrast, the study by Cárdenas and Barrientos (2008) finds a higher level of negative attitudes toward homosexuality among people who declare themselves to be in the center, an aspect that can be related to the form of questioning used (left-wing, center or right-wing), as it does not discriminate against different degrees of conservatism. On the other hand, the meta-study carried out by Penna Tosso (2015) concludes, as it happens in this research, that right-wing ideology is related to a greater sustaining of prejudices toward sexual diversity. It can be affirmed, therefore, that the ideological positioning conditions the type of attitudes that are maintained toward homosexuality and other sexual diversities (Rottenbacher, 2012; Scandurra et al., 2017), being the most conservative ideological approaches those that are related to greater levels of prejudice, since they are usually related to a greater perception of threat (Cohrs and Ibler, 2009).

CONCLUSION

Throughout the discussion, the main conclusions of the research have been drawn and the results obtained in similar works have been shown. Given the scarcity of studies on teachers' attitudes toward homosexuals, this work can be considered novel, since traditionally the analysis of homophobia and heterosexist attitudes has focused on students at school (Pérez-Testor et al., 2010; Penna Tosso and Sánchez Sáinz, 2015).

The present research has evaluated the presence of sexist attitudes and prejudice toward homosexual people in the future teachers. The results obtained are encouraging, as they show low levels of both forms of prejudice, contrasting with previous research (Robles-Reina et al., 2017; Carretero and Nolasco, 2019; Cordón et al., 2019). This fact may be due to an emerging social change, derived from the growing boom of feminist and LGBTIQ+ movements, and the March 8th protests. Therefore, in order to advance and deepen knowledge about gender equality and inclusion of sexual diversities in the educational field, we recommend research on teaching expectations, communicative action or teaching practice. In this regard, it may be useful to use the proposal for gender diagnosis made by Rebollo et al. (2011), which has been used in various research (García-Pérez et al., 2011; Piedra et al., 2014).

As for the possible relationship of the variables analyzed, coinciding with previous research (Expósito et al., 1998; Glick and Fiske, 2001; Rottenbacher et al., 2011), a positive correlation is found between the various forms of sexism studied (ambivalent, hostile, and benevolent) and negative attitudes toward homosexuality. It can be stated that these forms of prejudice are strongly linked (Penna Tosso, 2015; Penna Tosso and Sánchez Sáinz, 2015), since they support the sex/gender

system. Therefore, from a feminist perspective, as pointed out by Núñez Noriega (2016), it can be considered that negative attitudes and rejection of non-hegemonic identities are ways of concretizing and perpetuating the dominant patriarchal and heteronormative system.

Among the most remarkable results of the present study is the incidence of ideology, understood as a continuum from left to right or from liberalism to conservatism, in the two measures analyzed, ambivalent sexism (hostile and benevolent) and heterosexual attitudes toward homosexuals. A greater predisposition to prejudice is observed as ideological positioning becomes more conservative. Several studies have already shown this trend in hostile or prejudiced attitudes toward minority groups (Cohrs and Ibler, 2009; Rottenbacher, 2010, 2012; Rottenbacher et al., 2011). These findings reinforce the concern expressed by several authors regarding extreme right movements (Bartual-Figueras et al., 2018; López, 2018) and invite further research and elaboration on these issues.

This study has some limitations that should be highlighted. Firstly, it has been based on incidental sampling, which makes it difficult to generalize the results to the national context, despite the adequate sample size. On the other hand, although sexual and gender diversity has been considered in the design and development of the study, it is advisable to broaden the spectrum by identifying, for example, transgender or queer realities. The results found in relation to ideology reveal the need to broaden this type of issues in future research, using scales that measure ideological approaches and conservatism more accurately, such as those used by Rottenbacher (2010) and Rottenbacher et al. (2011). It should be remembered that the way the questions are asked is carried out conditions the replies found. In this sense, the study of previous training in gender equality and coeducation is also a limitation of this research, since it has focused on the number of hours received. It is convenient to study in depth other aspects of the training such as the contents, the knowledge acquired or the study of the providers of such

training. Likewise, it is considered necessary to extend and enrich the study, introducing the notion of sexual prejudice since this includes other diversities and sexual minorities (Herek, 2000). Finally, the low levels of sexism may highlight the need to evaluate sexism and the predisposition to gender equality, widely understood, with other instruments such as the one proposed by Rebollo et al. (2011), aimed specifically at the educational community. In any case, this work supports the need to continue advancing research on sexual prejudice, training, attitudes and the inclusion of sexual and gender diversities in the educational environment.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Ethics Committee of the University of Burgos. The participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

DH-S and DO-S designed the study, contributed in the process of research, defining the methodology, collecting the information in the different Spanish universities, and wrote the manuscript. DH-S carried out the statistical analysis, interpretation, and discussion of the results. DO-S was in charge of the final review. Both authors contributed to the article and approved the submitted version.

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Girls in STEM: Is It a Female Role-Model Thing?

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Women are underrepresented in STEM (science, technology, engineering, and mathematics) careers, and this poses new challenges at the dawn of the era of digital transformation. The goal of the present study is to demonstrate how female role models influence girls' preferences for STEM studies. This paper evaluates a role-model intervention in which female volunteers working in STEM go into schools to talk to girls about their careers. The study was conducted with 304 girls, from 12 years old (sixth primary grade) to 16 years old (fourth secondary grade), both before and after the role-model sessions. An adaptation of the expectancy–value theory of achievement motivation is used to test the extent to which this role-model intervention improves girls' beliefs that they can be successful in STEM fields and increases their likelihood of choosing a STEM career. The results of multigroup structural equation modeling analysis show that on average, the role-model intervention has a positive and significant effect on mathematics enjoyment, importance attached to math, expectations of success in math, and girls' aspirations in STEM, and a negative effect on gender stereotypes. Additionally, the female role-model sessions significantly increase the positive impact of expectations of success on STEM choices. Finally, the moderation role of the counterstereotypical content of the role-model sessions is tested. The results show that the higher the counterstereotypical character of the sessions, the higher the relationship between expectations of success in math and the choice of STEM. These results are discussed regarding their implications for long-term STEM engagement.

Keywords: gender role models, STEM, stereotypes, expectancy–value theory, career choice

INTRODUCTION

The proportion of women university students has increased from 46% in 1985 to 56% in 2017, and this has helped to improve their presence in the labor market, which on average means growth from 50.8% in 1985 to 52.5% in 2017 in countries belonging to the Organization for Economic Cooperation and Development (Organization for Economic Co-operation and Development (OECD), 2018a,b,c). However, gender equality in the workplace is far from being achieved. This labor gender gap is especially acute in professions that tend to be male dominated, with a high technological and mathematical component (i.e., fields known by the acronym STEM, for science, technology, engineering, and mathematics) (Kahn and Ginther, 2017). Indeed, women in OECD countries account for only 19% of entrants into tertiary level in these programs (Organization for Economic Co-operation and Development (OECD), 2018c).

Spain provides a paradigmatic picture of this situation. Despite of being reported as one of the countries with greater improvement in the most-recent edition of the Global Gender Gap Report (entering the top 10 from the previous edition's 29th position out of 153 countries in 2019), establishing itself as a champion against gender discrimination (World Economic Forum [WEF], 2020), large gender gaps in wages remain, income, and the presence of women in managerial positions. The labor participation of women is also lagging behind that of men (68.8% versus 78.9%). Advances already achieved are now in jeopardy with the digital transformation of the labor market, which might increase the economic gender gap produced by the underrepresentation of women in emerging professions. In Spain (Ministerio de Educación y Formación Profesional (MEFP), 2019), women are severely underrepresented in physical science (25.3%), electrical engineering (20.5%), electronics engineering (15.2%), computer science (12.0%), civil engineering (28.3%), industrial engineering (24.7%) and aeronautical engineering (23.5%), and they are overrepresented in fields oriented to biology and health, such as medicine (66.4%), biomedical engineering (59.1%), biology (61.8%), and chemistry (54.2%). The proportion of women with degrees in mathematics is even lower than it used to be (36.6% in 2019–2020 vs. 39.0% in 2015–2016) (Ministerio de Educación y Formación Profesional (MEFP), 2020). Removing the barriers that prevent women from accessing the science, research, and technology sectors will be key to changing the current academic orientation, which is essential for combating new forms of gender inequality (Shapiro et al., 2011).

This pattern of low representation of women in the STEM disciplines can also be seen in many Western and European countries. Indeed, the lack of girls choosing scientific studies may mean there is no critical mass of candidates prepared to access leadership positions (Kanter, 1977) and result in the exclusion of the feminine perspective in creating and developing solutions (World Economic Forum [WEF], 2020). Moreover, women should not miss out on fulfilling, rewarding, and highly paid careers in STEM, where employment growth rate is three times faster than for non-STEM jobs (Langdon et al., 2011). Educational background is also increasingly important in the appointment of directors to boards (Hitt and Tyler, 1991), where technological profiles are in high demand (Ruigrok et al., 2007) because they drive research and innovation (Barker and Mueller, 2002).

Much research has been devoted to identifying the beliefs of students about STEM competences and gendered motivational factors that influence their educational and career decisions (Hackett and Betz, 1981; Quimby and O'Brien, 2004; Sáinz and Eccles, 2012; Watt et al., 2012; Wang and Degol, 2014; Wang et al., 2017). This research draws on the expectancy–value theory of achievement motivation by Eccles and Wigfield (1995) and Wigfield and Eccles (2000). According to this theory (Eccles et al., 1983; Eccles, 2005), when expectations of success and the value of STEM degrees and careers are high, girls are much more likely to choose STEM pathways. Existing stereotypes about the nature of STEM work and people working in STEM become powerful drivers of gendered aspirations and affinities (Thébaud and Charles, 2018; Sáinz et al., 2019), supporting women's STEM

avoidance and men's STEM affinity (Glick and Fiske, 1999; Diekman and Eagly, 2008). A good way of overcoming stereotype barriers is through the intervention of female role models, who can increase the sense of belonging to STEM and reinforce the idea that hard work is the way to succeed in STEM (Weisgram and Bigler, 2007; Shin et al., 2016; Bertrand and Duflo, 2017).

In this study, we examine the effectiveness of a current and innovative role-model-based intervention on the perceptions that young girls (from 12 to 16 years old) have of gender stereotypes about mathematical competence, expectation of success in math, their degree of math enjoyment, and the importance attached to math, and how all of these contribute to shaping the likelihood that girls will choose STEM careers. We expect that the exposure to successful female role models in STEM fields could serve as a key driver to convey that they can succeed in these careers while still having a personal life (Marx et al., 2005; Williams and Ceci, 2012; Sáinz et al., 2019). This is especially relevant during the first stages of education because there is a consensus that the progressive abandonment of girls in some STEM fields (the start of the “leaking pipeline”) begins after the age of 12 (Sáinz and Eccles, 2012) given the predisposition of girls to underestimate their ability to be successful in STEM fields (Correll, 2001; Sáinz and Eccles, 2012).

The present study is especially innovative because it analyzes a field intervention involving actual female role models for young girls in schools at a national level. This is important because the relatively few existing studies on the impact of role models on the intention to pursue STEM careers (Plant et al., 2009; Stout et al., 2011; Van Camp et al., 2019) use mainly: computer-based agents, STEM role-model biographies, exposure to upper-level undergraduates, female professors, or female peer experts for female students who are already majoring in STEM disciplines, which can limit the scope and validity of their results. However, our study is carried out with actual STEM role-model women who are physically present in the classroom and who are talking in first-person terms about their own lives and professional experiences to young girls at a decisive stage of their lives (preadolescence), which is precisely when they start to consider dropping out from these disciplines because their individual self-efficacy is in flux. We consider that in comparison with other experimental designs, the present context could improve the closeness and experience that female role models provide to the young girls and, as a consequence, could boost the potential impact that this type of intervention has on their final intention to pursue STEM careers.

THEORY AND HYPOTHESES

STEM Career Choice: Expectancy–Value Theory

The expectancy–value theory developed by Eccles and her colleagues proposes that achievement-related choices can be predicted by the expectations a person has of succeeding, as well as subjective task values (Eccles et al., 1983; Eccles, 2005). This model has been used in different fields (e.g., math, reading, computing, health, communications, sports, marketing, and

economics) and specifically when trying to explain the gender gaps in STEM (e.g., Sáinz and Eccles, 2012; Eccles, 2015). The expectations of success and subjective task values are presumed to directly influence achievement-related choices, performance, and persistence (Eccles, 2015). Students will, therefore, be more likely to pursue those studies and academic options in which they think they can excel or that have a high value for them (Eccles and Wigfield, 1995; Sáinz and Eccles, 2012). That is, when expectations of success and the value of STEM disciplines are high, girls are much more likely to choose, persist in, and graduate from STEM fields (Eccles and Wigfield, 1995; Sáinz and Eccles, 2012; Eccles, 2015).

Expectancies and values are the two main components of the model, which, although different constructs, are highly correlated. Expectancies of success tend to predict children's task values. Whereas subjective task values are closely linked to educational or career choices (Wigfield and Eccles, 2002; Durik et al., 2006; Eccles, 2009; Wang et al., 2015), expectancies of success (i.e., self-concept of ability or self-perception of competence) are strongly related to performance.

According to the theory (Wigfield and Eccles, 2002; Eccles, 2005; Wigfield et al., 2006), expectations of success and task values are shaped by a combination of factors, from individual child characteristics (e.g., abilities, previous experiences, goals, self-concepts, beliefs, and expectations) to environmental influences (e.g., cultural milieu, peer beliefs, and behaviors). Subjective task values include the following motivational factors: attainment value or importance, intrinsic value (enjoyment), utility or usefulness of the task, and costs [Eccles et al. (1983) and Wigfield and Eccles (1992) discuss these components in more detail].

The influences of family, school, peers, mass media, and the immediate social environment shape the expectations that girls and boys have of success (and their self-concept of their own abilities) together with the value they attach to various subjects and academic domains (Eccles, 1994). Encouragement received from significant people (family, schools, peers, and others) to pursue mathematics or technology-related studies plays a major role in whether or not adolescents decide to pursue a career in STEM domains (Sáinz and Eccles, 2012; Eccles, 2015).

Shin et al. (2016) identified two stereotypes that affect the level of recruitment and retention of women in STEM fields. On one hand, there is the idea that STEM studies are difficult, and a person should be a brilliant or gifted student to succeed in them. On the other hand, there are cultural and social stereotypes about the characteristics of scientists and scientific jobs (i.e., people lacking social abilities, with an unattractive physical appearance, or freaks) that undermine the interest that girls may have in STEM, as they do not match these stereotypes. Further empirical research supports this analytical view (Cheryan et al., 2015; Sáinz et al., 2016, 2019). Shin et al. (2016) agree that a good way of overcoming these two barriers is through the intervention of female role models, as they can increase the sense of belonging to STEM and reinforce the idea that hard work is the way to succeed in STEM. We present the overall model to provide a sense of its scope (**Figure 1**).

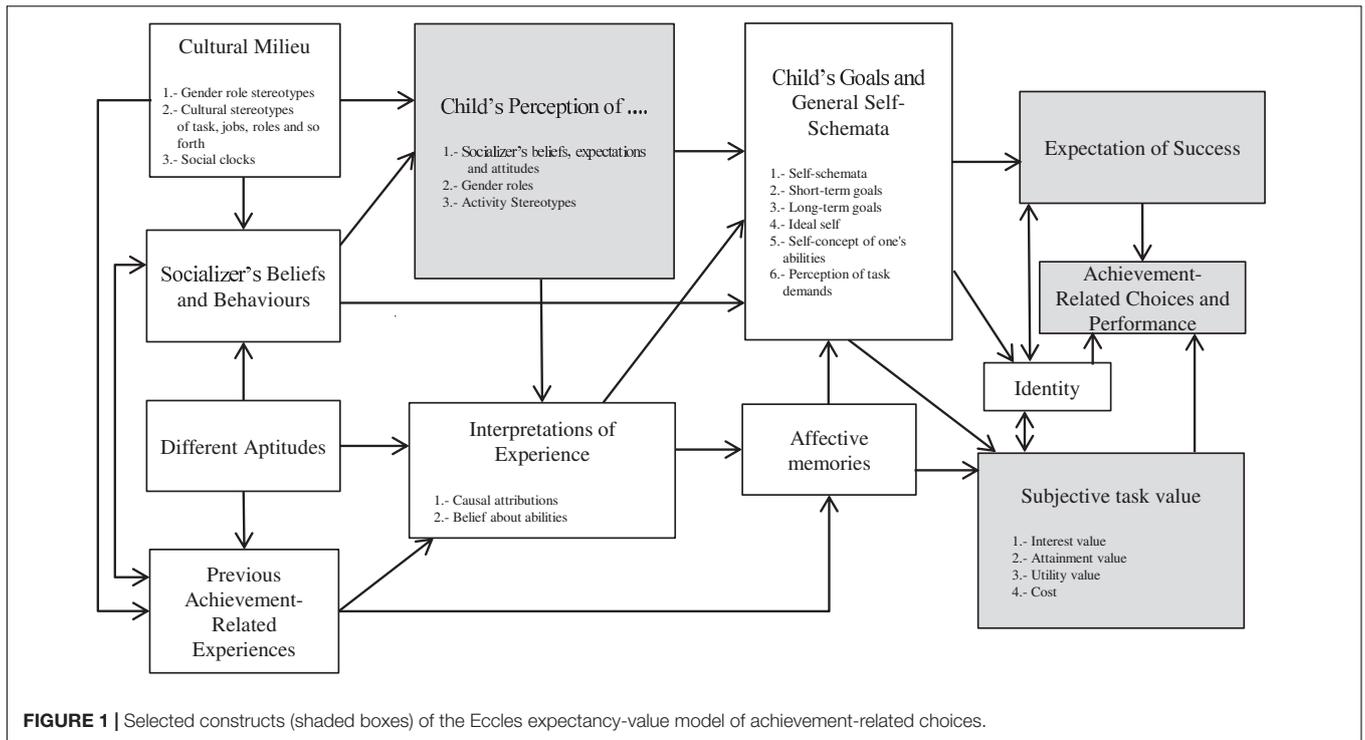
The present research focuses on how two elements of the task values (personal enjoyment and the importance attached to math) along with expectations of success predict the future STEM aspirations of a group of girls before and after having participated in a female role-model intervention. For this purpose, we focus the present work on a portion of the model; specifically, the constructs contained in the boxes related to expectancies and subjective task values boxes, along with the construct of child perception of gender role stereotypes (shaded boxes in **Figure 1**).

Expectations of success depend on both the confidence that individuals have in their various intellectual abilities, on their estimations of the difficulty of the options they are considering and on their estimates of the external or societal barriers to their success (Eccles, 1987; Eccles, 2005). Regarding the subjective task values, according to the theory (Eccles et al., 1983; Wigfield and Eccles, 1992; Eccles, 2005), they are assigned to a task (e.g., math) based on interest or personal enjoyment (intrinsic value), utility value, and attainment value. More specifically, interest or intrinsic value is the enjoyment one gains from doing the task (i.e., in our case the enjoyment value of doing a math exercise); attainment value is defined as the importance of doing well at a given task, which is given by the link between the mathematical topic and one's sense of self and identity; and utility value or usefulness refers to how a task fits into an individual's future plans, for instance, taking a math class to fulfill a requirement for a science degree. The latter two are usually combined and known as the importance value (e.g., Wigfield and Eccles, 2002; Eccles, 2005), so we have grouped them in that way. As we can see in our theoretical model, although being highly correlated, all these motivational factors tends to predict the choice of a STEM career in a positive way.

The theory also considers the role played by gender stereotypes (another social-cognitive process) in shaping gender differences in the choice of a STEM career (Bussey and Bandura, 1999). Girls tend to move away from some STEM disciplines, as success in a STEM career is commonly associated with a high degree of intellectual brilliance, and brilliantness is stereotypically correlated with masculinity (Eccles et al., 1998; Guimond and Roussel, 2001; Sáinz et al., 2019). Frenzel et al. (2007) found that girls, when addressing a scientific problem, were more insecure and considered themselves more incompetent, and that their degree of enjoyment was lower. This is why women tend to avoid disciplines with a strong mathematical load (Wigfield and Eccles, 2002; Eccles, 2005, 2008; Sáinz and Eccles, 2012). In this way, gender-role stereotypes in math should act as a direct deterrent when it comes to choosing a STEM career.

As illustrated in **Figure 2**, the present paper theorizes that a girl's choice of a STEM career can be explained by the relationships among the following key identity, social, and motivational factors associated with math (a basic required competence across STEM fields that is the basis of science higher education in most academic institutions and that students often have to choose as they advance academically): expectations of success, math enjoyment, importance, and gender stereotypes about math ability.

All that said, for a better understanding of how gender-role stereotypes and motivational factors prevent or encourage



girls from entering STEM careers, we propose the following hypothesis:

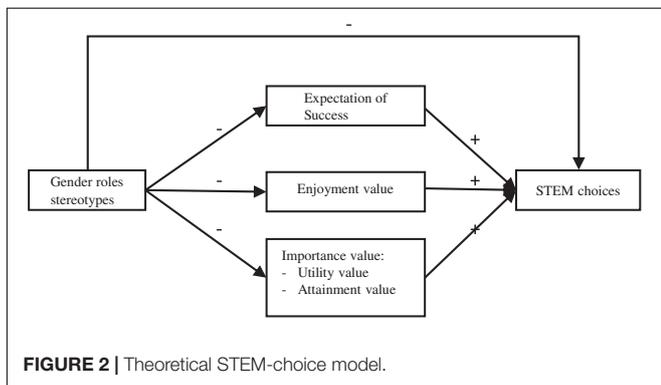
H1: Expectancy-value-related motivational factors predict positively female-student preferences for a STEM career, whereas gender-role stereotypes have a negative effect both in these motivational factors and on the intention to pursue a STEM career.

Role-Model Influence

Role models can be inspirational and can reduce the self-stereotyping of stigmatized groups, and this may be the case for women in male-dominated STEM fields (Lockwood, 2006; Betz and Sekaquaptewa, 2012; O'Brien et al., 2017). Interventions based on role models revolve around enhancing a sense of belonging and identity in STEM fields, thereby fostering the personal connections of girls to the STEM community (Casad

et al., 2018; Van Camp et al., 2019). Scholars have identified two factors that affect the efficacy of the inspiration that role models provide for individuals (Lockwood and Kunda, 1997), namely (i) the perceived relevance of the role model to the individual (i.e., domain relevance) and (ii) the believed attainability of the role model's success. Dasgupta (2011) used the theoretical lens of the stereotype inoculation model to explain how contact with successful female STEM role models can serve as "social vaccines" that protect the self-concept of women in STEM against stereotypes.

There is evidence that among STEM women, perceptions of incompatibility between their gender and STEM identities (i.e., the extent to which people perceive their identity as a woman or man to fit with their identity as a STEM member) are related to a lesser sense of belonging, greater insecurity, and less motivation in STEM, as well as greater expectations of dropping out of STEM (London et al., 2011). Same-gender role models seem to be a more effective option for attracting young women into STEM (Bussey and Bandura, 1999; Cheryan et al., 2011; Stout et al., 2011). Female-oriented STEM promotion thus requires role models (sometimes mentors) who not only work in a STEM field but who are also female. However, because the participation rates of women in these fields are low, finding a sufficient number of professional women in STEM fields such as engineering and physical science is challenging. This could explain the sparse research about the influence of same-sex role models on the intention to choose a STEM career and the use of computer-based agents, biographies, or teachers as close substitutes for actual female STEM role models. So, Stout et al. (2011) discovered that women exposed to female calculus professors showed enhanced self-efficacy, greater self-concept, as well as a higher identification



with and commitment to STEM, even among students who still maintained gender stereotypes. In a similar vein, Plant et al. (2009) exposed middle-school girls to computer-based female role models and found that the role model was effective at promoting academic interest and motivation among girls. It is therefore not surprising that exposure to role-model biographies that challenge common STEM stereotypes (e.g., that STEM is for gifted individuals) has also been demonstrated to have positive effects on both STEM and non-STEM student interests in STEM, as well as their perceived identity compatibility between themselves and STEM (Shin et al., 2016; Sáinz et al., 2019). Role-model exposure also has a positive impact on academic sense of belonging among STEM and non-STEM students, and a positive impact on academic self-efficacy among STEM students, but not non-STEM students (Shin et al., 2016).

Numerous and varied initiatives based on role models have been launched all over the world to make STEM fields more attractive to girls and increase their interest in these professions (Van Camp et al., 2019; Sáinz, 2020). As in the case of any other intervention, the effectiveness of the female role-model-oriented intervention depends on several indicators, such as the scope of the intervention, the theoretical background inspiring it, the design, measures, and tools to evaluate its impact, educational agents involved in the intervention, its sustainability, and so on (Sáinz, 2020). For instance, Breda et al. (2018) demonstrated that girls participating in the intervention had a lower level of stereotypes than did girls in the control group. Their STEM interest also increased by between 20 and 30% above that of the control group. Equally, the probability that top-performing girls in math would be enrolled in a STEM program increased by 50% from a baseline of 28%. Among these top-achieving girls, the program reduced the baseline gender gap in the enrolment in selective STEM programs by a third, from 22 to 14%. In comparison to this previous research, our study contributes to literature analyzing the influence of a two-step female role-model intervention not only on female students' gender stereotypes about women's STEM abilities, but also on female students' motivational outcomes (i.e., expectation of success, enjoyment, and importance value), as well as, interest in pursuing STEM fields. Additionally, we look at changes in not only mean values but also in the relationships among the model variables.

Indeed, not only do role models and mentors help broaden the perspectives of who can work in the STEM field, they also expand students' perceptions of their own potential (Johnson et al., 2020). Research shows the positive impact of interaction with STEM professionals on students' STEM interest (Kesar, 2018). Therefore, it is reasonable to expect that girls are more motivated (in terms of expectation of success, enjoyment, and importance) to engage in subjects related with STEM fields, such as math, after interacting with female role models in STEM than before doing so.

Based on the above rationale, to evaluate the effectiveness of the female role models' intervention, we posit the following hypotheses:

H2a: Female-student participation in the role-model sessions increases the mean value of the motivational factors considered in our theoretical model (expectations of success, enjoyment, and

importance), as well as that of the intention to pursue a STEM career, while decreasing the mean value of gender stereotypes about STEM abilities.

H2b: Female-student participation in the role-model sessions increases the positive effect of the motivational factors (expectations of success, enjoyment, and importance) on the intention to pursue a STEM career, while strengthening the negative impact of gender stereotypes on these motivational factors, as well as on preferences for a STEM career (i.e., role-model sessions have a moderator effect).

Counterstereotypical Role-Model Influence on Girls' STEM Choices

According to gender theories [gender schema theory (Martin and Halverson, 1981) and social role theory (Eagly and Wood, 2011)], people perceive certain roles to be more or less appropriate for their gender. This means that observing men and women in gender-congruent roles fosters gender-congruent aspirations and behavior. By contrast, following the rationale that observing or interacting with men and women in non-traditional domains provides a so-called gender-counterstereotypical role model, the frequent exposure to gender-incongruent role models should reduce gender stereotyping and promote non-traditional behavior (Olsson and Martiny, 2018).

Based on this idea, numerous initiatives and research-based interventions involving observing or interacting with gender-counterstereotypical role models have been implemented in several countries, particularly focusing on outcomes for girls and women. The review of these interventions carried out by Olsson and Martiny (2018) shows that exposure to or interaction with counterstereotypical role models can reduce gender stereotyping during childhood and preadolescence among girls on a short-term basis. However, the changes in stereotypes are not always sustained and do not necessarily affect children's aspirations and behavior. In this regard, Olsson and Martiny (2018) recommend that future research should assess whether a change in stereotypes is internalized and acted upon. The present work follows this recommendation by investigating not only the changes in young girls' gender stereotypes after the intervention but also its influence on their STEM career aspirations.

Although STEM stereotypes are incongruent with the female gender role, they can be conveyed to a certain degree by women as well (Cheryan et al., 2011). In STEM, these stereotypes include a tendency toward social isolation and a singular focus on technology (Barbercheck, 2001). In contrast, the female gender role prescribes many opposing characteristics, such as helping and working with others (e.g., teamwork) and being socially skilled (e.g., communication skills). Young girls who encounter stereotypical STEM role models may feel dissimilar from them and, as a result, the talks of those stereotypical role models who are supposed to inspire emulation may have a lower effect or even deter those they were meant to benefit (Cheryan et al., 2011). For this reason, when we look for a specific measure of the counterstereotypical content of the female role-model sessions, we focus on the congruent content that the girls may be provided with by the female role models during the sessions. A content is

defined as congruent if the role-model discourse includes, among the requirements to follow a STEM profession, the demand for non-stereotypical skills (especially, social and communications skills, which are congruent with their gender behavior).

Against this background, we tested for differences in our model relations within the post-intervention sample between those sessions perceived as highly counterstereotypical by the girls and those that were not. To test this, we postulate our third hypothesis:

H3: Highly counterstereotypical role-model sessions strengthen the possible changes observed in the relationship(s) of the constructs in the theoretical model (i.e., the counterstereotypical content of the sessions plays a role as a strength moderator).

MATERIALS AND METHODS

Procedure

This study is part of the program of the Inspiring Girls Foundation (IGF), whose main objective is to raise girls' aspirations in STEM by connecting them with female role models. The IGF has implemented a cutting-edge program, recruiting top women leaders from STEM companies as role models to go into schools to talk about their careers and experiences in the profession. All volunteers follow an innovative digital onboarding training process before engaging in the program. This training highlights the importance of volunteers talking about the opportunities and requirements to enter their jobs, the contribution that their jobs make to the real world, and the opportunities for making work and private life compatible, as well as the negative effects of gender stereotypes in career choices. The sessions are organized through a platform for role models, where participating schools can access female STEM experts directly (Inspiring Girls Foundation [IGF], 2018). Another key strength of this project is that each group of students meets three female role models. These interactions increase the probability that girls are exposed to women with diverse personality traits, physical appearance, socio-demographical characteristics (e.g., civil status and number of children), ages, and professional paths, which provides the intervention with a higher diversity and inclusiveness compared with other experimental designs.

Sample

We designed two questionnaires that were administered in 2018–2019 to 304 girls from 12 years old (sixth primary grade) to 16 years old (fourth secondary grade) who responded before and after the role-model sessions. The first questionnaire was administered 1 week before the role-model session and the second 1 month after. A total of 16 schools participated: 11 were public and five were private. At nine schools, the family income of the students was the average for Spain; at the other seven, it was above average. Seven schools were in the south of Spain (Malaga, Seville, Almeria, Cadiz, and Huelva), four in the center (Madrid and Toledo), four in

the east (Barcelona, Valencia, and Alicante), and one in the north (Navarra).

Study Design

The empirical strategy was as follows. First, the relationship between the social (stereotypes) and motivational factors in our theoretical STEM-choice model were tested by using structural equation modeling (SEM) with the whole data set (H1). Next, the effectiveness of female role-model interventions was examined, comparing the differences in the mean of the constructs (H2a) and changes in the relationships after the role-model sessions (H2b). Finally, we tested for differences in these relationships between the sessions perceived as highly counterstereotypical by the girls and those that were not (H3). To do this, we ran a multigroup SEM within the post-intervention sample. Within this post-intervention sample, we tested for invariance in the changed relationships after the intervention between (i) the sessions considered highly counterstereotypical by the girls in terms of the content that they were provided with and (ii) those that were not, to check for the possible strength-moderator effect of this characteristic of the sessions.

For ethical reasons, the IGF considers it inappropriate to assign schoolchildren randomly to a particular female role model. Therefore, the present research used a one-group pre-test and post-test design methodology (Campbell and Stanley, 1963). Pre-test/post-test designs are used widely in behavioral research, primarily to compare groups and/or measure changes resulting from experimental treatments and interventions (Dimitrov and Rumrill, 2003). To avoid the risks related to the internal validity of this type of design (Knapp, 2016), and to minimize the negative effects that could stem from the absence of a control group, we applied the following rules. To reduce the effects of history (i.e., some other event occurring at the same time of the intervention that could be the cause of the change in the outcome) and maturation (i.e., if there is a long time before and after the intervention, the participants have grown older and more mature), we used the shortest time gap possible between pre-test (1 week before the sessions) and the post-test (1 month after); we did not use a cognitive test, so the testing effect (i.e., the fact that the questions might be familiar and therefore easier after the interventions) is unlikely to appear; and we eliminated the instrumentation effect (i.e., using different people to score or rate the pre-experimental and post-experimental measurements) by having the questions scored by the same people (i.e., the girls) before and after the role-model interventions. Finally, regarding statistical regression toward the mean, although strictly speaking the sample was not selected randomly, we consider that because it comprised girls from different regions and socio-economic status in Spain from both public and private schools, it should include a variety of attitudes and opinions regarding the questions asked.

Once the possible effectiveness of the role-model intervention was analyzed through this design, an additional multigroup SEM analysis was carried out to test whether the counterstereotypical content of the sessions could act as a strength moderator of the changes found in the models' relation(s) after the role-model sessions. A multigroup model nested in the post-test model was run using the girls' perception of the role models' reporting

about the need for counterstereotypical skills (e.g., social and communication abilities) among the requirements for following a STEM career as a grouping variable.

Measures

Data were collected using a reduced version of the expectancy-value questionnaire (EVQ). The EVQ is an empirically validated survey (Eccles and Wigfield, 1995) developed to measure career aspirations and educational choices. Following Eccles and Harold (1991) and Eccles and Wigfield (1995), all items were measured on a seven-point Likert scale (where 1 indicated “strongly disagree” and 7 “strongly agree”). The original items from the EVQ were translated into Spanish and two members of the research team made a back translation. Once this back translation was ready, to identify potential issues with the survey design that might lead to practical problems with implementation, a pilot study was carried out between April and June 2018. We recruited girls who were aged among 12–16, from six Spanish Schools in Cadiz, Malaga, and Madrid, which had previously attended the role models’ sessions to be sure the participants belonged to the same target group of the main study. The final sample for the first stage of the pilot was 126 students, but it decreased to 38 in the second wave.

The participants completed the questionnaires in the same way that it would be completed in the actual project (i.e., through an online platform). Once they had completed the two designed questionnaires, we found no significant problems on the survey design, except for the low rate of participation in the second wave. To address this problem in the main study, we asked for collaboration to the call center in charged with communication with the schools to track more closely the participation of the schools in both waves and to insist to the teachers of those that hadn’t answered yet, of the importance of transmitting to their students the need of answering the second questionnaire. As a result, in the main study the drop out ratio between waves was negligible.

Gender Stereotypes About Math Abilities

The gender stereotypes revolved around the higher math abilities and motivation of boys compared to girls (Li, 2007). Three items were used: “Math is more important for boys,” “Boys do better in math than girls,” and “In the future, math will be more useful for boys.”

Expectations of Math Success

The following seven items measuring several aspects related to girls’ expectations of success in math from expectancy-value theory were translated into Spanish (Eccles and Wigfield, 1995). Students had to rate their degree of agreement with the following statements: “I am talented at math”; “I expect to do well in a STEM degree”; “Math is easy for me”; “Learning new things in math is easy for me”; “I am more talented at math than other students in my class”; “I am more talented at math than at other subjects”; “I expect to do well at math this year.”

Math Enjoyment

Students had to rate their math enjoyment using the following five items, translated into Spanish: “I like math”; “I find math enjoyable”; “I learn a lot of interesting things in math”; “I like to solve math problems”; “I enjoy doing math exercises” (Wigfield and Eccles, 2002).

Importance Attached to Math

Students had to rate their level of agreement with seven items measuring the attainment and utility attached to math: “Mathematical skills increase job opportunities” (Wigfield and Eccles, 1992); “Mathematical skills will allow me to choose the work/career that I want”; “Mathematical skills are useful in the everyday world”; “Math is more useful than other subjects”; “I have always wanted to do well in math”; “I prefer doing well in math rather than in other subjects”; “Doing well at math makes me feel good” (Wigfield and Eccles, 2002).

STEM Career Choice

Students had to rate their likelihood of choosing a university degree across the following four STEM disciplines: math, physical science, computer science, and engineering (Stoeger et al., 2016). We created a construct that includes all the disciplines that usually configure the STEM field because we are interested in the overall result of all the degrees, not in a single specific one.

STEM Counterstereotypical Content of the Sessions: Highly Counterstereotypical Sessions Versus Lower Counterstereotypical Sessions

Because we could not manipulate the stereotypical content of the role models by using variable tuning, we included three items in the post-test questionnaire to measure the degree to which the girls perceived the role models as more counterstereotypical: “This profession requires communication skills,” “This profession requires teamwork,” and “This profession requires social skills.” We chose these three questions because they show skills (such as communication and teamwork) that are more congruent with the female gender role (social abilities).

Next, we grouped the after-session data into two subsets to test the counterstereotypical content of the sessions as a possible strength moderator of the relationships that change after the interventions. A confirmatory factor analysis (CFA) was conducted (Table 1) on the three questions. The factorial score was transformed into a dummy variable, using its median as a cut point. This produced a balanced split of the sample, with 50% of the cases having a value equal to 1 (Rigdon et al., 1998).

Construct Validity

Construct reliability assessment routinely focuses on composite reliability as an estimate of a construct’s internal consistency (Hair et al., 2011). Composite reliability values of 0.70–0.90 are regarded as satisfactory (Nunnally and Bernstein, 1994), whereas values below 0.60 indicate a lack of reliability. All the constructs in the present study have values over 0.8, well above the suggested threshold value. Likewise, each indicator’s absolute standardized loading should be higher than 0.70. Generally, indicators with loadings of 0.40–0.70 should be considered for removal from the

TABLE 1 | Confirmatory factor analysis (CFA) of counter-stereotypical content of the sessions.

Question		Loadings	AVE	Cronbach alpha
Counter-stereotypical content			0.679	0.858
Talk1	This profession requires teamwork	0.932		
Talk2	This profession requires social skills	0.788		
Talk3	This profession requires communication skills	0.740		

scale only if doing so increases the composite reliability above the suggested threshold value (Hair et al., 2011). In the present study, all the items have loadings above or very near the cut-off value of 0.7. Only one item has a lower value (i.e., computing at 0.58), but deleting it does not increase the composite reliability of the construct STEM choice (0.825) (Hair et al., 2011).

The validity assessment of reflective measurement models focuses on convergent and discriminant validity. Researchers must examine the average variance extracted (AVE) for convergent validity. An AVE value of 0.50 or higher indicates a sufficient degree of convergent validity, meaning that the latent variable explains more than half of its indicators' variance (Hair et al., 2011). As **Table 2** shows, all the constructs have AVE values of at least 0.5 or very close to this cut-off (the lowest one corresponds to the construct "STEM choice").

The Fornell–Larcker criterion (Fornell and Larcker, 1981) was followed for the assessment of discriminant validity, where a latent construct shares more variance with its assigned indicators than with another latent variable in the structural model. The AVE of each latent construct should therefore be greater than the latent construct's highest squared correlation with any other latent construct. Similarly, another more liberal criterion is met for every single item. Congruently, an indicator's loading with its associated latent construct should be higher than its loadings with all the remaining constructs (i.e., the cross loadings).

RESULTS

All the analyses were conducted with the SEM in Stata 15.1. Several indicators of model fit were used, including χ^2/df , the root mean square error of approximation (RMSEA), the Tucker–Lewis index (TLI), and the comparative fit index (CFI). General guidelines for the cut-off values of the different indicators suggest that an adequate fit is supported by $RMSEA < 0.06$, $CFI > 0.90$, $TLI > 0.90$, and $\chi^2/df < 2$ (e.g., Byrne, 1998; Hu and Bentler, 1999; Raykov and Marcoulides, 2000). All the models presented herein satisfy these conditions and were estimated with full information maximum likelihood to incorporate cases with missing data (Enders, 2010). Robust standard errors were clustered by schools. We provide correlation matrices for replicability purposes in **Tables 3A,B**. **Table 3A** shows the correlation matrix for the all the variables before and after the role model sessions, whereas, **Table 3B** displays the correlations

for the same variables but for low and high counterstereotypical sessions within the post-intervention sample.

Measurement Models and Invariance

To assess the invariances between the two points in time (before and after the role-model sessions), a measurement model was estimated, including the five constructs in **Figure 3**, because they are focal constructs in the following STEM-choice models. The five constructs included in the measurement model were gender stereotypes, expectations of success, enjoyment, importance, and STEM choice. All constructs were specified as latent variables, and the covariances between all five constructs were estimated.

The unconstrained multigroup CFAs (model 1) showed adequate model fits across a range of frequently emphasized fit statistics for the latent constructs ($\chi^2/df = 1.936$; $RMSEA = 0.055$; $TLI = 0.947$; $CFI = 0.953$).

After confirming the goodness of fit of the CFAs, the invariances between the two moments were explored. The sequence of analyses began with a combined multiple-group model with no cross-time equality constraints for the five latent constructs before and after the role-model sessions (model 1). Second, the constraint that item loadings are invariant between the two moments was added (model 2). Third, the constraint that loadings as well as item error variances are equivalent across samples was added (model 3). Finally, the constraint that loadings as well as intercepts are equivalent across samples was added (model 4). The nested models were compared according to the change in the χ^2 statistic relative to that in the degrees of freedom; a significant worsening of model fit indicates that the imposed model constraints are not tenable.

The model fits for sequential constrained models 1–4 for each of the latent constructs are given in **Table 4**. The fit statistics of models 1 and 2 (the unconstrained and loading-invariant models, respectively) are acceptable, and the change in χ^2 is not statistically significant. This result implies that the condition of partial scalar invariance is therefore met (e.g., Byrne, 2010), indicating that the time difference does not differentially affect the underlying measurement characteristics of the constructs; i.e., the constructs have the same meaning before and after attending the role-model sessions, and quantitative comparisons of factor scores can be undertaken meaningfully at both points in time. The factor loadings, which are all statistically significant, are presented in **Table 2**.

Model 3 (loading and error-variance invariant) and model 4 (loading and intercept invariant) cannot be accepted because of a statistically significant worsening in the change in χ^2 with respect to model 2. This implies that the heterogeneity and mean values of the constructs changed after the role-model sessions, indicating (as will be shown later) the effectiveness of these interventions in changing the motivational factors, gender stereotypes, and STEM choice of girls.

Testing the Theoretical STEM-Choice Model (H1)

Having ensured the partial scalar invariance and the consistency of the constructs before and after the role-model sessions, path

TABLE 2 | CFA factor loadings, AVE, Cronbach's alpha reliabilities, and cross loadings.

Question	Loadings	AVE	Cronbach alpha		Cross correlations			
			Enjoyment	Importance	Stereotype	Expectations	STEM choice	
Enjoyment		0.751	0.939					
Enj1	I like math	0.865			0.509	-0.178	0.633	0.511
Enj2	I like to solve math problems	0.867			0.534	-0.178	0.611	0.517
Enj3	I learn a lot of interesting things in math	0.809			0.506	-0.183	0.527	0.489
Enj4	I find math enjoyable	0.908			0.502	-0.176	0.597	0.502
Enj5	I enjoy doing math exercises	0.881			0.521	-0.180	0.638	0.512
Importance		0.518	0.895					
Ut1	Mathematical skills will allow me to choose the work/career that I want	0.765			0.499	-0.288	0.516	0.465
Ut2	Mathematical skills are useful in everyday world	0.733			0.471	-0.245	0.437	0.375
Ut3	Math is more useful than other subjects	0.725			0.386	-0.244	0.348	0.313
Ut4	Mathematical skills increase job opportunities	0.791			0.430	-0.257	0.481	0.355
Att1	Doing well in math makes me feel good	0.681			0.453	-0.274	0.398	0.364
Att2	I have always wanted to do well in math	0.674			0.411	-0.278	0.327	0.354
Att3	I prefer doing well in math than in other subjects	0.660			0.405	-0.226	0.369	0.286
Stereotype		0.682	0.865					
St1	Boys do better in math than girls	0.860			-0.211	-0.298	-0.249	-0.320
St2	In the future, math will be more useful for boys	0.848			-0.131	-0.298	-0.262	-0.290
St3	Math is more important for boys	0.765			-0.153	-0.228	-0.222	-0.267
Expectations		0.751	0.956					
Exp1	I am talented at math	0.905			0.646	0.536	-0.288	0.662
Exp2	I expect to do well in a STEM degree	0.867			0.643	0.524	-0.245	0.617
Exp3	Math is easy for me	0.888			0.675	0.510	-0.244	0.654
Exp4	Learning new things in math is easy for me	0.889			0.657	0.535	-0.257	0.650
Exp5	I am more talented at math than other students in my class	0.837			0.585	0.492	-0.274	0.608
Exp6	I am more talented at math than in other subjects	0.839			0.630	0.455	-0.278	0.579
Exp7	I expect to do well at math this year	0.839			0.549	0.532	-0.226	0.590
STEM_choice		0.481	0.824					
Maths	I am considering math as a career for the future	0.774			0.512	0.424	-0.258	0.586
Physics	I am considering physics as a career for the future	0.789			0.424	0.400	-0.309	0.504
Engineering	I am considering engineering as a career for the future	0.605			0.334	0.354	-0.230	0.419
Computing	I am considering computing as a career for the future	0.581			0.253	0.252	-0.171	0.303

models were used to test the theoretical STEM-choice model. The model includes all of the paths and covariances shown in **Figure 4**, as well as paths estimating the predictive relations

between gender stereotypes and the motivational constructs (i.e., expectations of success, enjoyment, importance, and STEM choice) shown in **Figure 3**.

TABLE 3A | Correlation matrix.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Mean (<i>t</i> = 1)	SD (<i>t</i> = 1)
Enj1	1	0.777	0.679	0.800	0.768	0.423	0.393	0.336	0.369	0.387	0.342	0.363	-0.157	-0.112	-0.121	0.538	0.558	0.595	0.536	0.529	0.545	0.458	0.449	0.337	0.300	0.179	4.37	1.78
Enj2	0.740	1	0.627	0.746	0.760	0.459	0.431	0.353	0.397	0.417	0.393	0.432	-0.187	-0.134	-0.190	0.468	0.522	0.538	0.498	0.512	0.509	0.409	0.439	0.357	0.328	0.213	4.09	1.87
Enj3	0.722	0.691	1	0.751	0.674	0.386	0.439	0.341	0.396	0.418	0.411	0.260	-0.199	-0.113	-0.111	0.429	0.435	0.442	0.457	0.378	0.337	0.362	0.356	0.328	0.241	0.242	4.86	1.69
Enj4	0.781	0.778	0.768	1	0.798	0.414	0.390	0.361	0.355	0.418	0.366	0.370	-0.149	-0.062	-0.185	0.492	0.529	0.538	0.511	0.464	0.508	0.380	0.405	0.318	0.263	0.184	4.50	1.71
Enj5	0.746	0.771	0.689	0.812	1	0.437	0.419	0.352	0.408	0.430	0.400	0.371	-0.158	-0.114	-0.188	0.501	0.516	0.539	0.543	0.497	0.523	0.400	0.393	0.332	0.282	0.185	4.37	1.86
Ut1	0.359	0.349	0.387	0.362	0.376	1	0.552	0.577	0.687	0.490	0.507	0.514	-0.216	-0.242	-0.161	0.430	0.476	0.394	0.425	0.400	0.352	0.358	0.363	0.309	0.374	0.223	4.95	1.91
Ut2	0.381	0.385	0.458	0.376	0.387	0.553	1	0.556	0.643	0.538	0.569	0.390	-0.270	-0.191	-0.167	0.330	0.326	0.305	0.357	0.329	0.249	0.345	0.272	0.234	0.240	0.131	5.36	1.61
Ut3	0.262	0.261	0.254	0.288	0.306	0.513	0.516	1	0.680	0.538	0.549	0.539	-0.171	-0.226	-0.127	0.308	0.340	0.260	0.316	0.290	0.325	0.285	0.233	0.271	0.212	0.146	4.94	1.76
Ut4	0.343	0.329	0.365	0.325	0.321	0.626	0.603	0.587	1	0.559	0.591	0.494	-0.224	-0.298	-0.179	0.429	0.447	0.378	0.391	0.369	0.338	0.376	0.268	0.255	0.233	0.131	5.09	1.70
At1	0.314	0.284	0.347	0.324	0.322	0.551	0.526	0.443	0.499	1	0.608	0.419	-0.206	-0.173	-0.192	0.266	0.311	0.295	0.273	0.265	0.265	0.311	0.248	0.232	0.219	0.158	5.08	1.70
At2	0.314	0.304	0.353	0.337	0.359	0.461	0.596	0.500	0.479	0.546	1	0.412	-0.231	-0.158	-0.127	0.264	0.282	0.258	0.318	0.221	0.191	0.281	0.292	0.232	0.226	0.232	5.44	1.67
At3	0.312	0.297	0.312	0.356	0.324	0.526	0.463	0.560	0.480	0.452	0.439	1	-0.156	-0.200	-0.116	0.256	0.292	0.286	0.293	0.293	0.311	0.143	0.213	0.172	0.213	0.084	4.76	1.89
St1	-0.158	-0.149	-0.223	-0.178	-0.152	-0.197	-0.206	-0.155	-0.188	-0.207	-0.249	-0.103	1	0.713	0.612	-0.177	-0.165	-0.133	-0.196	-0.123	-0.070	-0.161	-0.199	-0.279	-0.226	-0.127	1.31	0.90
St2	-0.116	-0.110	-0.133	-0.110	-0.112	-0.193	-0.172	-0.161	-0.206	-0.176	-0.156	-0.080	0.722	1	0.627	-0.232	-0.217	-0.169	-0.221	-0.160	-0.133	-0.206	-0.197	-0.185	-0.202	-0.102	1.37	1.04
St3	-0.084	-0.078	-0.072	-0.105	-0.088	-0.133	-0.186	-0.102	-0.133	-0.152	-0.169	-0.073	0.680	0.645	1	-0.197	-0.226	-0.183	-0.247	-0.147	-0.167	-0.189	-0.180	-0.191	-0.113	-0.104	1.42	0.99
Exp1	0.642	0.598	0.590	0.641	0.640	0.509	0.404	0.293	0.396	0.373	0.297	0.408	-0.191	-0.221	-0.125	1	0.809	0.808	0.811	0.805	0.782	0.800	0.548	0.468	0.440	0.273	4.14	1.87
Exp2	0.603	0.611	0.580	0.602	0.616	0.481	0.324	0.268	0.389	0.365	0.268	0.340	-0.207	-0.172	-0.105	0.779	1	0.767	0.770	0.756	0.789	0.718	0.526	0.426	0.426	0.237	3.92	1.93
Exp3	0.650	0.610	0.603	0.620	0.597	0.420	0.328	0.213	0.374	0.338	0.250	0.387	-0.184	-0.199	-0.118	0.802	0.763	1	0.827	0.777	0.798	0.710	0.575	0.491	0.450	0.298	3.72	1.81
Exp4	0.650	0.627	0.595	0.598	0.654	0.491	0.427	0.326	0.419	0.383	0.314	0.424	-0.210	-0.209	-0.163	0.793	0.772	0.809	1	0.766	0.733	0.731	0.563	0.472	0.431	0.329	4.04	1.88
Exp5	0.561	0.535	0.453	0.476	0.528	0.367	0.327	0.228	0.342	0.300	0.198	0.308	-0.159	-0.171	-0.087	0.760	0.722	0.751	0.754	1	0.775	0.708	0.529	0.467	0.471	0.260	3.54	1.93
Exp6	0.605	0.578	0.474	0.593	0.598	0.366	0.280	0.261	0.297	0.331	0.187	0.397	-0.133	-0.141	-0.117	0.758	0.736	0.742	0.712	0.733	1	0.675	0.530	0.417	0.433	0.190	3.61	2.01
Exp7	0.544	0.521	0.533	0.553	0.538	0.452	0.442	0.340	0.433	0.422	0.349	0.377	-0.245	-0.237	-0.216	0.769	0.704	0.700	0.708	0.649	0.637	1	0.463	0.393	0.351	0.268	4.38	1.81
Maths	0.493	0.500	0.497	0.509	0.512	0.410	0.341	0.224	0.284	0.357	0.271	0.309	-0.238	-0.232	-0.212	0.538	0.568	0.520	0.532	0.478	0.510	0.477	1	0.585	0.566	0.493	3.37	1.92
Physics	0.383	0.400	0.433	0.409	0.395	0.356	0.290	0.219	0.236	0.322	0.268	0.198	-0.293	-0.279	-0.271	0.486	0.435	0.440	0.444	0.407	0.386	0.452	0.616	1	0.589	0.578	3.52	2.03
Engin	0.244	0.250	0.316	0.334	0.306	0.314	0.308	0.123	0.161	0.209	0.281	0.158	-0.216	-0.184	-0.173	0.409	0.296	0.282	0.286	0.273	0.206	0.385	0.374	0.490	1	0.499	3.82	2.12
Comput	0.223	0.173	0.322	0.222	0.233	0.231	0.199	0.169	0.196	0.222	0.245	0.073	-0.178	-0.101	-0.161	0.285	0.231	0.288	0.277	0.191	0.101	0.282	0.433	0.525	0.295	1	3.09	2.05
Mean (<i>t</i> = 0)	3.58	3.30	3.96	3.66	3.72	4.20	4.72	4.29	4.40	4.30	4.75	3.73	1.76	1.80	1.95	3.78	3.32	3.32	3.53	3.01	3.09	4.07	2.28	2.50	2.50	2.45		
SD (<i>t</i> = 0)	1.73	1.64	1.68	1.67	1.75	1.84	1.71	1.69	1.62	1.73	1.74	1.71	1.36	1.46	1.50	1.84	1.84	1.74	1.76	1.87	1.84	1.73	1.61	1.81	1.85	1.78		

t = 0 (bottom-left triangle) and *t* = 1 (top-right triangle).

TABLE 3B | Correlation matrix.

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	Mean (high)	SD (high)
Enj1	1	0.781	0.726	0.851	0.794	0.490	0.436	0.377	0.381	0.469	0.450	0.406	-0.035	0.055	0.053	0.620	0.656	0.669	0.579	0.626	0.630	0.491	0.519	0.395	0.443	0.229	4.61	1.85
Enj2	0.770	1	0.725	0.787	0.729	0.476	0.482	0.444	0.457	0.505	0.512	0.437	-0.105	-0.030	-0.063	0.557	0.628	0.630	0.543	0.568	0.610	0.481	0.528	0.446	0.427	0.251	4.32	1.95
Enj3	0.628	0.501	1	0.823	0.762	0.408	0.539	0.369	0.394	0.470	0.482	0.342	-0.027	0.106	0.027	0.493	0.542	0.559	0.514	0.504	0.450	0.394	0.394	0.363	0.315	0.314	4.96	1.77
Enj4	0.706	0.688	0.640	1	0.862	0.430	0.465	0.419	0.358	0.502	0.462	0.372	-0.042	0.113	-0.003	0.537	0.601	0.618	0.553	0.545	0.592	0.396	0.431	0.417	0.371	0.220	4.63	1.89
Enj5	0.703	0.789	0.551	0.680	1	0.441	0.438	0.410	0.414	0.514	0.478	0.372	0.003	0.049	-0.004	0.554	0.599	0.598	0.573	0.566	0.595	0.441	0.423	0.388	0.323	0.179	4.61	1.92
Ut1	0.323	0.434	0.292	0.395	0.421	1	0.571	0.561	0.679	0.467	0.465	0.509	-0.105	-0.253	-0.084	0.498	0.522	0.475	0.503	0.484	0.437	0.403	0.428	0.403	0.371	0.213	5.03	1.99
Ut2	0.351	0.339	0.289	0.276	0.386	0.522	1	0.588	0.620	0.498	0.584	0.476	-0.082	0.005	0.076	0.347	0.349	0.361	0.415	0.350	0.295	0.354	0.305	0.323	0.260	0.164	5.46	1.63
Ut3	0.258	0.177	0.270	0.246	0.230	0.611	0.503	1	0.699	0.471	0.521	0.553	-0.096	-0.215	-0.065	0.363	0.423	0.319	0.410	0.354	0.403	0.354	0.286	0.318	0.232	0.120	4.99	1.75
Ut4	0.307	0.287	0.360	0.330	0.393	0.696	0.695	0.662	1	0.536	0.567	0.559	-0.080	-0.270	-0.071	0.491	0.506	0.466	0.484	0.464	0.428	0.454	0.328	0.371	0.231	0.200	5.15	1.75
At1	0.284	0.269	0.337	0.294	0.308	0.502	0.540	0.607	0.603	1	0.621	0.419	-0.025	-0.082	-0.049	0.348	0.365	0.439	0.342	0.340	0.371	0.367	0.330	0.319	0.218	0.212	5.27	1.67
At2	0.232	0.260	0.285	0.246	0.302	0.551	0.506	0.586	0.673	0.616	1	0.519	-0.170	-0.060	0.073	0.324	0.387	0.359	0.386	0.299	0.296	0.323	0.356	0.319	0.239	0.239	5.58	1.70
At3	0.305	0.374	0.137	0.361	0.357	0.577	0.248	0.533	0.419	0.438	0.334	1	-0.156	-0.239	-0.139	0.351	0.335	0.329	0.384	0.357	0.335	0.248	0.321	0.314	0.324	0.163	4.60	1.87
St1	-0.258	-0.259	-0.274	-0.213	-0.262	-0.262	-0.336	-0.197	-0.297	-0.263	-0.126	-0.168	1	0.524	0.541	-0.081	-0.095	-0.121	-0.152	-0.139	-0.147	-0.132	-0.110	-0.217	-0.119	0.004	1.17	0.62
St2	-0.264	-0.223	-0.250	-0.209	-0.231	-0.162	-0.242	-0.200	-0.268	-0.146	-0.062	-0.160	0.708	1	0.674	-0.221	-0.177	-0.167	-0.220	-0.201	-0.212	-0.220	-0.125	-0.158	-0.093	-0.028	1.25	0.86
St3	-0.253	-0.270	-0.229	-0.358	-0.308	-0.211	-0.314	-0.121	-0.280	-0.320	-0.210	-0.127	0.576	0.539	1	-0.148	-0.180	-0.162	-0.199	-0.154	-0.232	-0.125	-0.063	-0.158	-0.062	0.019	1.25	0.76
Exp1	0.381	0.334	0.316	0.405	0.396	0.373	0.323	0.250	0.346	0.148	0.217	0.196	-0.225	-0.235	-0.280	1	0.815	0.820	0.824	0.811	0.789	0.798	0.584	0.468	0.475	0.246	4.45	1.85
Exp2	0.374	0.357	0.261	0.400	0.376	0.447	0.304	0.285	0.366	0.234	0.191	0.300	-0.249	-0.291	-0.375	0.791	1	0.794	0.794	0.770	0.794	0.713	0.598	0.509	0.458	0.270	4.17	2.05
Exp3	0.460	0.398	0.252	0.398	0.443	0.283	0.226	0.228	0.230	0.138	0.156	0.276	-0.123	-0.153	-0.225	0.802	0.720	1	0.830	0.781	0.792	0.696	0.609	0.565	0.531	0.347	3.95	1.87
Exp4	0.422	0.421	0.333	0.425	0.473	0.324	0.314	0.245	0.241	0.230	0.257	0.239	-0.219	-0.213	-0.341	0.816	0.750	0.818	1	0.789	0.728	0.693	0.612	0.555	0.500	0.348	4.33	1.96
Exp5	0.373	0.404	0.242	0.349	0.388	0.346	0.325	0.246	0.253	0.157	0.194	0.226	-0.169	-0.182	-0.241	0.811	0.724	0.808	0.786	1	0.737	0.693	0.584	0.535	0.560	0.277	3.78	2.03
Exp6	0.383	0.329	0.206	0.371	0.403	0.294	0.241	0.275	0.230	0.156	0.141	0.305	-0.141	-0.189	-0.251	0.815	0.805	0.854	0.799	0.845	1	0.642	0.591	0.475	0.513	0.218	3.80	2.15
Exp7	0.430	0.378	0.341	0.401	0.395	0.350	0.387	0.286	0.312	0.259	0.266	0.174	-0.149	-0.188	-0.263	0.828	0.727	0.760	0.818	0.788	0.801	1	0.494	0.376	0.383	0.251	4.81	1.72
Maths	0.277	0.204	0.246	0.315	0.205	0.257	0.182	0.173	0.221	0.112	0.105	0.054	-0.206	-0.294	-0.235	0.481	0.419	0.500	0.456	0.454	0.472	0.481	1	0.694	0.678	0.565	3.81	2.12
Physics	0.202	0.184	0.231	0.128	0.195	0.187	0.092	0.190	0.105	0.052	0.072	0.038	-0.403	-0.251	-0.289	0.419	0.269	0.397	0.358	0.345	0.314	0.394	0.344	1	0.671	0.603	3.90	2.11
Engin	0.047	0.166	0.050	0.063	0.174	0.361	0.120	0.161	0.202	0.086	0.124	0.027	-0.290	-0.269	-0.190	0.429	0.417	0.352	0.336	0.407	0.381	0.385	0.409	0.487	1	0.513	3.98	2.22
Comput	0.163	0.230	0.187	0.197	0.237	0.291	0.116	0.265	0.120	0.098	0.205	0.117	-0.292	-0.273	-0.280	0.380	0.264	0.300	0.355	0.307	0.268	0.359	0.374	0.628	0.510	1	3.33	2.17
Mean (low)	4.17	4.02	4.78	4.43	4.23	4.88	5.30	4.97	5.07	4.98	5.27	5.15	1.42	1.46	1.55	3.79	3.65	3.41	3.71	3.32	3.42	3.84	2.84	3.02	3.62	2.75		
SD (low)	1.66	1.71	1.56	1.47	1.71	1.82	1.55	1.74	1.64	1.58	1.56	1.79	0.93	1.06	1.02	1.88	1.77	1.76	1.73	1.78	1.82	1.81	1.47	1.83	1.93	1.80		

Low Counterstereotypical (bottom-left triangle) and High Counterstereotypical (top-right triangle) for $t = 1$.

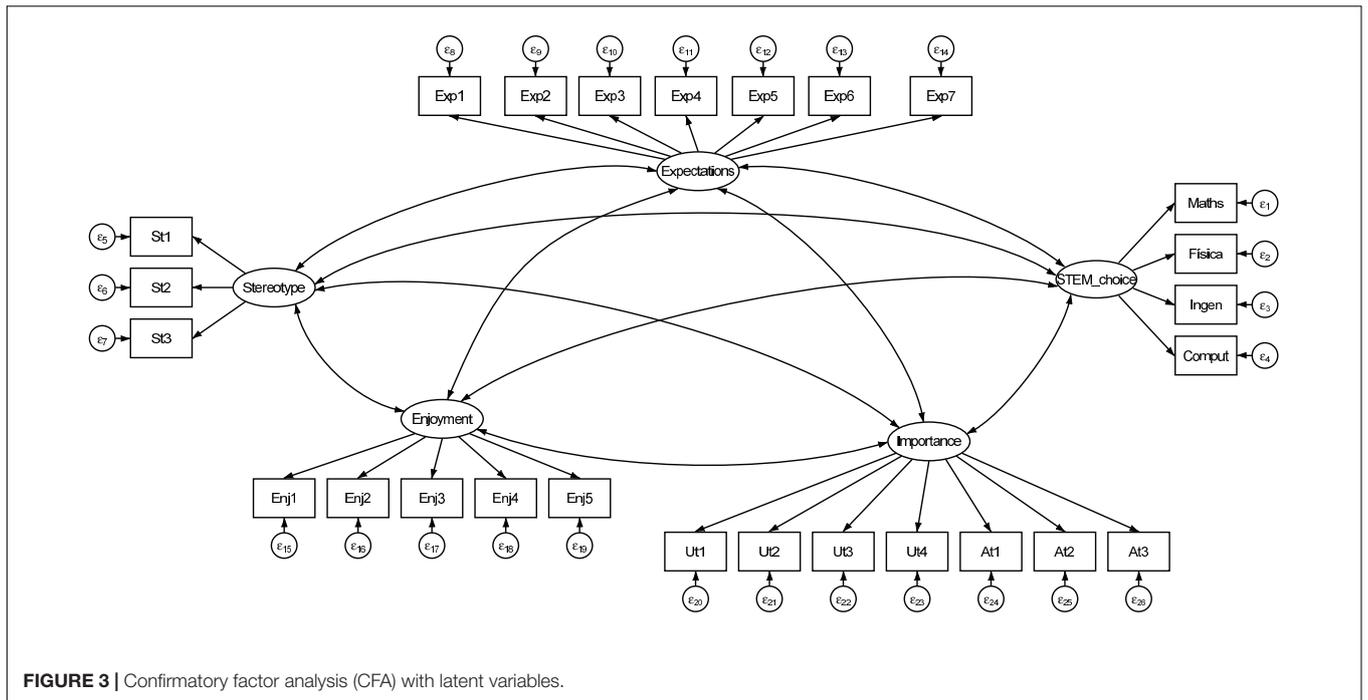


FIGURE 3 | Confirmatory factor analysis (CFA) with latent variables.

TABLE 4 | Fit statistics for sequential constrained models.

Model	Chi squared	df	Chi squared/df	Comparison	Chi squared	df	p-value	RMSEA	CFI	TLI
(1) Same form model	1,118.8	578	1.936					0.055	0.953	0.947
(2) Equal loadings model	1,143.7	599	1.909	1 vs. 2	24.84	21	0.254	0.055	0.953	0.949
(3) Equal loadings and error variances model	1,250.4	625	2.001	2 vs. 3	106.72	26	0.000	0.057	0.946	0.944
(4) Equal loadings and cons model	1,285.1	625	2.056	2 vs. 4	141.42	26	0.000	0.059	0.943	0.940

Selected model in bold.

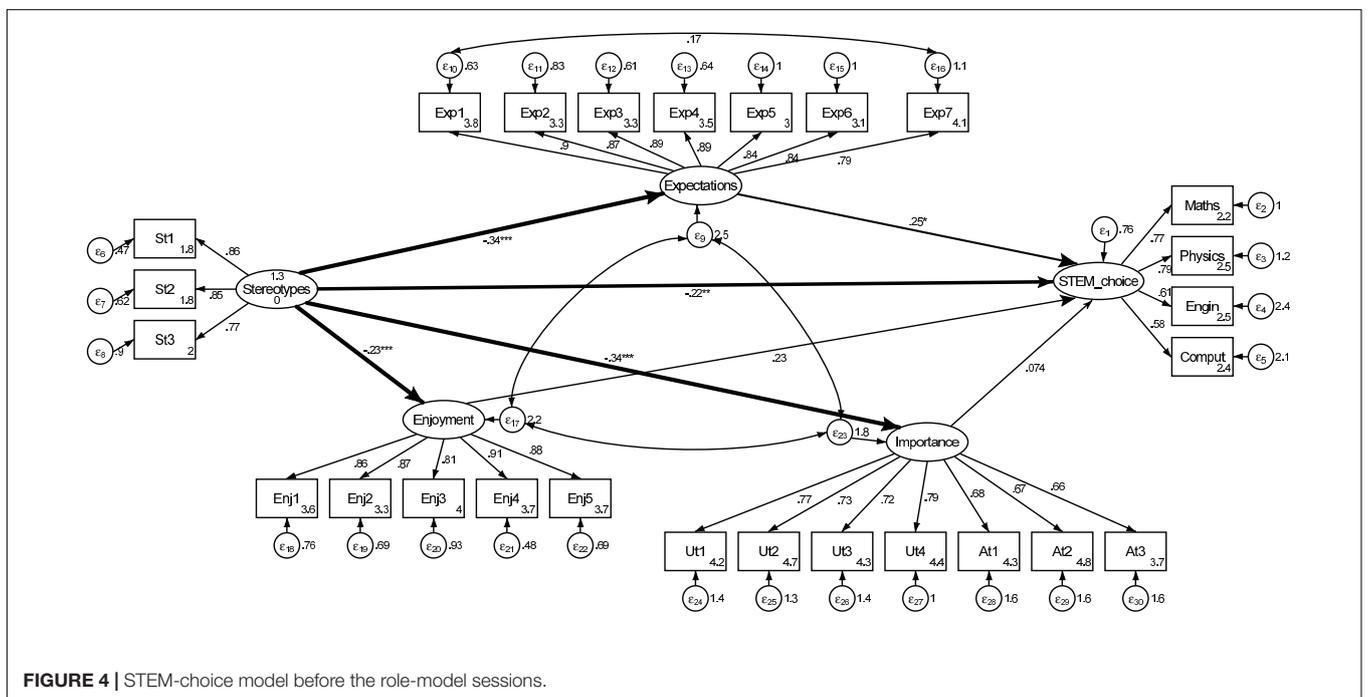


FIGURE 4 | STEM-choice model before the role-model sessions.

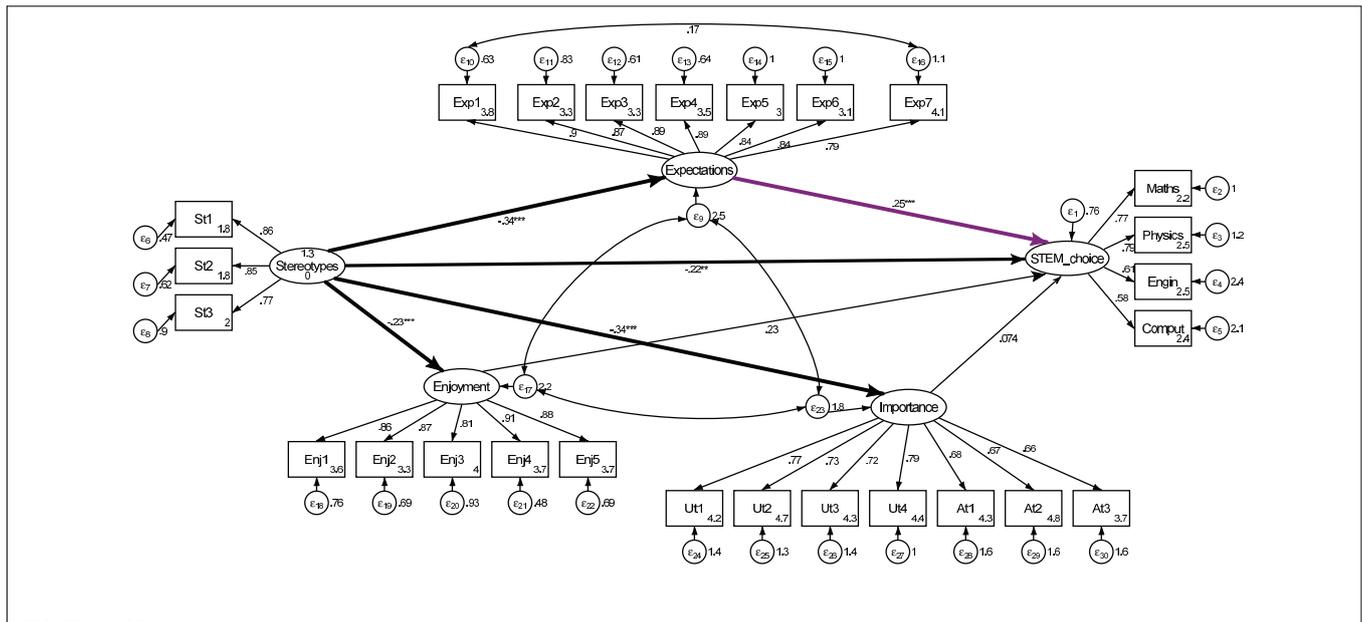


FIGURE 5 | SEM-choice model after the role-model sessions.

The STEM-choice path model fits the data well (see Table 5). This discussion concentrates on the relationships depicted in Figure 4 (i.e., proposed in the theoretical model) because they are the focus of H1. Overall, the findings confirm, at least partially, the hypothesized relationships for the STEM-choice model (Figure 5). Stereotypes have a negative significant (direct) effect at 5% on STEM choices, although it will be seen later that the total effect is stronger and highly significant. Expectations of success have the highest and most-significant positive effect on STEM choice (although only marginal before the role-model interventions). However, there is no evidence supporting the positive influence of enjoyment and importance on STEM choice, these being because these constructs seem to have no significant effect on girls’ interests in choosing a STEM career.

Total and Indirect Effects of Role Stereotypes

In the STEM-choice model, stereotypes about math ability have both a direct and indirect influence on STEM choice, and so direct and indirect effects were tested through the motivational constructs of enjoyment, importance, and expectations of success with indirect effects in Stata. Table 6 shows the total effect, together with one direct and three indirect effects that make up the total effect.

The results suggest the indirect effects of stereotypes about math abilities on STEM choice via the three motivational factors of the model. As seen in Table 6, the total effect of stereotypes about math abilities on the STEM-choice model is negative and highly significant. This is due to adding the indirect effect of stereotypes via enjoyment, importance, and especially expectations of success to the direct effect of the construct. The indirect effects thus suggest that although stereotypes about math abilities have a significant direct effect on STEM choice at 5%, their total effect (especially via expectations) is highly significant both before and after the role-model interventions.

Testing Mean-Level Differences in Research Variables (H2a)

First, differences in student motivations and gender stereotypes about math abilities after the role-model sessions were examined by using univariate *t*-test scores (Table 7). As anticipated in the CFA model, there are several significant differences across time. The variables of enjoyment, importance, expectations of success, and STEM choice increase significantly after attending the role-model sessions. Conversely, stereotypes regarding women’s lower math abilities decrease significantly after attending the role-model sessions. These findings are consistent with the predictions made in H2a.

Testing the Moderator Effect of the Role-Model Sessions (H2b)

After changes in the mean value of the constructs were confirmed, whether the relations in the STEM-choice model (i.e., the path model described under H1) vary after the role-model sessions was also tested. Moderation of the role-model sessions through multigroup SEMs was also tested (Little, 2013). For these purposes, the change in χ^2 ($\Delta\chi^2$) was examined across two nested models: one that freely estimated the predictive paths and covariances for each group separately, and another that constrained all or some of the predictive paths and covariances to be equal across two moments in time.

Differences in the path coefficients were tested using likelihood ratio tests (Table 5, LR test column). At both points in time, the estimated path coefficients kept their sign and similar significance. The outcomes suggested that there is an increase in the path coefficient from expectations to STEM choice that goes from marginally significant to highly significant after the role-model interventions. This result shows that the positive influence of expectations on STEM choice is reinforced

after attending the role-model sessions, thus confirming H2b. A strengthening in the negative influence of stereotypes about math abilities on importance after the role-model sessions is also observed, which is also consistent with the moderator effect of the sessions predicted in H2b. This highlights the relevance of these interventions. That is, reducing the weight of stereotypes about math abilities has a strong effect on the importance that girls attribute to doing well in math, a basic competence in high demand in STEM careers.

Testing the Counterstereotypical Content of the Sessions as a Moderator of Strength (H3)

To delve into the possible causes of the moderating effect of the role-model sessions, we examined the possible influence of a role model mentioning during a session that counterstereotypical skills are among the

TABLE 7 | Means and univariate *t*-test scores before and after the role-model sessions.

Latent variable	Difference	Std. err	t stat	p-value
Enjoyment	0.769	0.121	6.336	0.000
Importance	0.766	0.111	6.935	0.000
Stereotypes	-0.419	0.075	-5.594	0.000
Expectations	0.503	0.134	3.768	0.000
STEM choice	0.791	0.103	7.691	0.000

Estimated from model 3.

requirements for following a STEM career. Multigroup SEMs were run within the sample after the role-model sessions to evaluate the possible role of the counterstereotypical content of the sessions as a moderator of strength (Bentler, 1995) on the effect of expectations on STEM choices.

TABLE 5 | Estimated path coefficients (final model).

Path coefficient	t = 0				t = 1			LR test	
	b	B	St. Dv.		b	B	St. Dv.		
Stereotype → enjoyment	-0.179	-0.232	(0.051)	***	-0.464	-0.406	(0.136)	***	1.25
Stereotype → importance	-0.274	-0.337	(0.093)	***	-0.336	-0.633	(0.121)	***	4.27
Stereotype → expectations	-0.248	-0.341	(0.063)	***	0.233	-0.537	(0.207)	***	1.52
Stereotype → STEM choice	-0.205	-0.218	(0.084)	**	-0.128	-0.253	(0.149)	**	0.05
Enjoyment → STEM choice	0.277	0.227	(0.185)		0.109	0.106	(0.134)		1.05
Importance → STEM choice	0.086	0.074	(0.072)		0.023	0.024	(0.121)		0.21
Expectations → STEM choice	0.327	0.253	(0.114)	*	0.557	0.478	(0.095)	***	4.54
Cov (enjoyment, importance)	0.544	1.102	(0.151)	***					
Cov (enjoyment, expectations)	0.767	1.743	(0.231)	***					
Cov (expectations, importance)	0.530	1.116	(0.162)	***					
Chi2 (601)	1,120								
Chi(2)/df	1.863								
RMSEA	0.053								
CFI	0.955								
TLI	0.951								
R2 overall	0.870								

Invariant loadings and covariance between interest and enjoyment, mean(stereotypes) = 0. Robust standard errors clustered by school. *b* = standardized path coefficient. *B* = unstandardized path coefficient. *, **, *** represent 10%, 5%, 1% significance levels respectively.

TABLE 6 | Total, direct, and indirect effects for stereotypes.

Path coefficient	t = 0			t = 1		
	b	St. Dv.		b	St. Dv.	
Stereotype → STEM choice						
Total effect	-0.381	(0.084)	***	-0.568	(0.207)	***
Total indirect effect	-0.164	(0.045)	***	-0.315	(0.081)	***
Via Enjoyment	-0.049			-0.057		
Via Importance	-0.016			-0.006		
Via Expectations	-0.055			-0.121		
Direct effect	-0.218	(0.084)	**	-0.253	(0.149)	**

Invariant loadings and covariance between interest and enjoyment, mean(stereotypes) = 0. *b* = standardized path coefficient. Robust standard errors clustered by school. *, **, *** represent 10%, 5%, 1% significance levels respectively.

TABLE 8 | Means and univariate *t*-test scores between girls who perceived the role-model sessions as counter-stereotypical and those who did not.

Latent variable	Low counter-stereotypical	High counter-stereotypical	Difference	Std. err	<i>t</i> stat	<i>p</i> -value
Enjoyment	0.283	0.576	0.293	0.175	1.679	0.094
Importance	0.288	0.549	0.261	0.160	1.633	0.104
Stereotypes	-0.039	-0.273	-0.234	0.081	-2.876	0.004
Expectations	-0.044	0.539	0.582	0.192	3.030	0.003
STEM choice	0.158	0.718	0.560	0.158	3.538	0.001

Estimated from model 3.

A dummy variable was used to group the sessions into two clusters, one comprising the sessions that the participants considered to be highly counterstereotypical regarding the demand for social and communication skills among STEM career requirements, and another comprising the remaining sessions that the participants perceived to be more stereotypical.

According to the results in **Table 8**, expectations and STEM choice increase significantly among girls who believe that the role-model sessions are highly counterstereotypical about STEM career requirements. Meanwhile, the stereotype construct regarding math abilities decrease significantly. Finally, there is no significant effect on importance and only a marginal effect on enjoyment.

After confirming the changes in the mean values of the constructs, the analysis concentrated on testing whether the relationships in the STEM-choice model after the role-model sessions vary between those girls who considered the role-model sessions to be highly counterstereotypical and those who considered the sessions to be more stereotypical. In particular, we tested whether there are significant changes in the path coefficient that measures the influence of expectations of success on STEM choice between the two groups of girls. As the results in **Table 9** show, there is a significant increase in the path coefficient from expectations to STEM choice. Thus, we conclude that participant feedback on whether the sessions about STEM career requirements are counterstereotypical acts as a moderator, thus confirming H3.

Finally, the marginal effect of expectations of success on STEM choice in both groups is shown in **Figure 6**. The effect of expectations on STEM choice after the intervention is between the minimum value for this path coefficient estimated from those

girls who perceive the interventions as being more stereotypical and the maximum value obtained for those girls who consider the sessions to be highly counterstereotypical.

CONCLUSION AND DISCUSSION

This research contributes to the literature on how to increase girls' interest in STEM through a female role-model-based intervention. This study advances our understanding of the influence of female role models in improving girls' preferences for STEM by exploring the change in the mean values of the constructs (i.e., mean-level group differences) and in their relationships (i.e., moderation) by using an adaptation of the expectancy-value model of career choice in STEM fields. The findings of this research show that the optimal way to encourage young girls to pursue emerging high-growth roles, particularly those requiring STEM math skills, is to expose them to the professional and personal experiences of actual female role models with a successful professional trajectory in STEM fields.

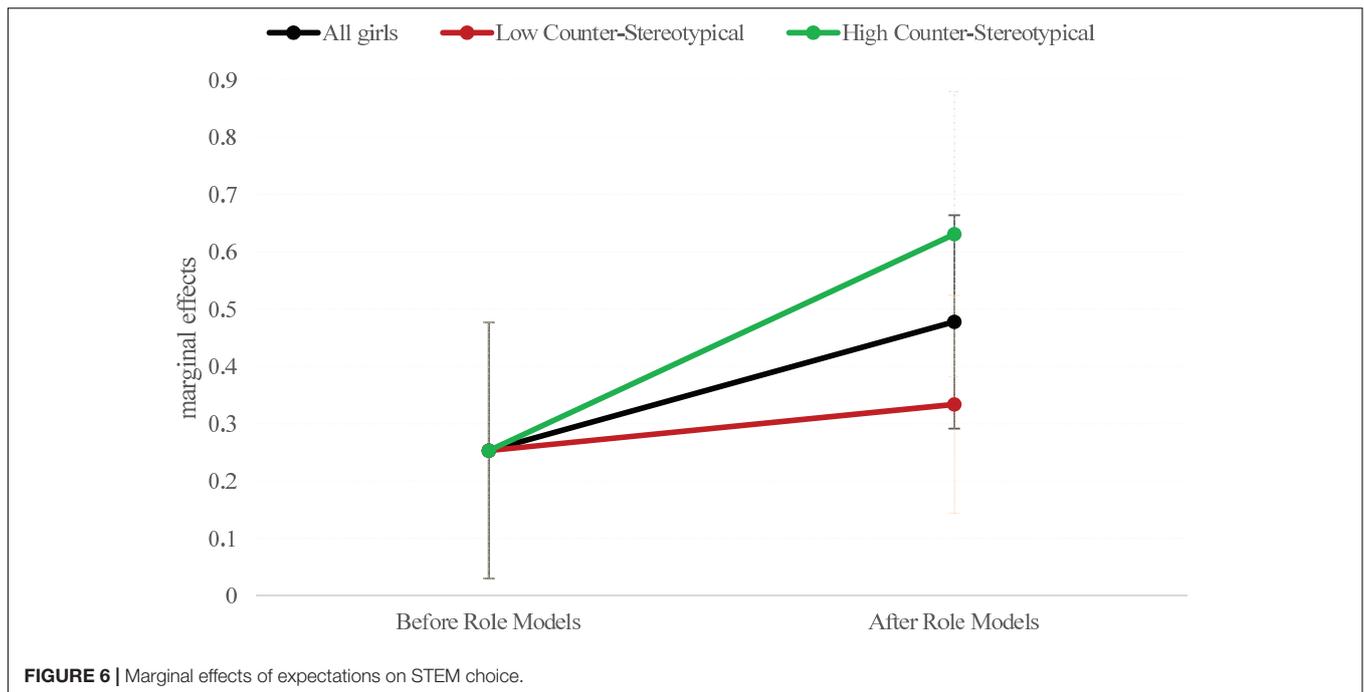
On average, the role-model sessions significantly increased the two considered task-value factors of the expectancy-value theory (i.e., enjoyment and importance), as well as girls' expectations of success in math, together with girls' preference for a STEM career. These sessions also contributed to decreasing the effect of gender-role stereotypes. Additionally, the female role-model sessions had a moderator effect in increasing the influence of expectations of success on STEM choices. In particular, when young girls perceive that counterstereotypical skills (such as teamworking, communication, and social skills) are among the requirements demanded across the different STEM professions, the positive effect that the expectation of success has on the intention to pursue a STEM career is reinforced. Thus, the counterstereotypical content of the sessions acted as a moderator because it strengthened the influence that expectations of success had on STEM choices.

This result could be because the impact of ability beliefs on STEM choice depends on the extent to which the stereotypes (resp. counterstereotypes) are incongruent (resp. congruent) with individuals' self-concepts and goals (Starr, 2019). Indeed, according to the theory of role congruity (Diekmann et al., 2010), social skills are more congruent with the communal goals (e.g., working with or helping other people) that women are more likely to endorse. Thus, in this case the concordance occurs when girls perceive that among the requirements for following a STEM career, which are usually thought mainly to include masculine agentic goals such as developing instrumental and

TABLE 9 | Estimated path coefficients with high/low counter-stereotypical groups for the post role-model sessions period.

Path coefficient	Low counter-stereotypical	High counter-stereotypical	LR test
	<i>B</i>	<i>B</i>	
Stereotype → enjoyment	-0.491	-0.063	1.68
Stereotype → importance	-0.652	-0.526	0.19
Stereotype → expectations	-0.351	-0.783	1.67
Stereotype → STEM choice	-0.468	-0.101	1.14
Enjoyment → STEM choice	-0.055	0.186	2.04
Importance → STEM choice	0.057	-0.069	0.57
Expectations → STEM choice	0.334	0.631	4.29 **

*, **, *** represent 10%, 5%, 1% significance levels respectively.



technical tasks, there are counterstereotypical skills in this field (such as communication and social abilities). This congruence acts as a strength moderator of the positive impact of expectancy beliefs on STEM choice.

Of course, many other dimensions of the role-model sessions could also play a moderator role, but the sessions were designed especially to offer the girls firsthand information about the actual skills and abilities formally or informally needed to pursue a STEM career from the direct experience of a female expert in those fields. A wide range of studies have shown that the preferences for certain jobs and skill sets among men and women are shaped by both the expectation and experience of diversity and inclusion across occupations (Seron et al., 2016; Cardador, 2017; Kang et al., 2019). This could be due, in part, to the increase in the feelings of belonging and inclusion in these domains that they experience after having been exposed to female role models who are successful in STEM fields (Walton and Cohen, 2007; Shin et al., 2016; Casad et al., 2018; Kang et al., 2019; Van Camp et al., 2019).

These interventions also strengthen the link between stereotypes about math abilities and the importance that girls attach to a task highly related to STEM, such as doing math (Wigfield and Eccles, 2002). This suggests the relevance of these interventions because exposing girls to female role models who contradict stereotypical portrayals of people in STEM fields produces a greater increase in the subjective value (in terms of importance) that the girls participating in the intervention session attach to STEM subjects (Cheryan et al., 2015; Sáinz et al., 2019).

The analysis of the total and indirect effects of role stereotypes shows that congruent with expectations, stereotypes about math abilities have a negative total effect on girls' intentions to choose

a STEM field (Sáinz and Eccles, 2012). This effect is highly significant and stronger than the direct effect, especially via expectations of success. This latter result is explained by the negative drag that gender stereotypes have on girls' expectations regarding their abilities and skills in a usually male-dominated world, such as that of many STEM fields (Rosenthal et al., 2011; Good et al., 2012; Shin et al., 2016). All of these authors agree that these stereotypes should be overcome because they could undermine the recruitment and retention of female STEM students who do not match these stereotypes.

The findings of the present study make several important contributions to the existing literature on role models and girls in STEM, which can help future research and policies on this topic. Much of the previous research was focused on undergraduate or high-school students (e.g., Anderson and Gilbride, 2003; Rosenthal et al., 2011; Shin et al., 2016; Van Camp et al., 2019), but the present research addresses girls from and above 12 years old because this is the age when their self-perception of competence and self-confidence begins to fall (Willms and Jacobsen, 1990; Sáinz and Eccles, 2012). This implies that future research should be focused on the start of the leaky pipeline, before students specialize and choose their different academic tracks in secondary education and beyond, which is especially relevant if the intention is to fix this problem from the very beginning. Another important contribution is the identification, through a one-group pretest-post-test design, of female role-model interventions as a way of reducing stereotypes and of boosting the motivational factors that play an important role in girls' engagement with STEM fields. This type of design to evaluate the effectiveness of these role-model interventions is especially versatile, and although, in general, it still has some limitations, certain rules have been applied to mitigate the negative effects that could stem from the

absence of a control group. The fact that girls find STEM careers more interesting after the role-model sessions is also worth mentioning. This is aligned with the literature on role-model interventions (Shin et al., 2016; Van Camp et al., 2019).

Finally, it is also important to highlight that the present role-model exposure was not carried out in an experimental or artificial environment (with avatars or online biographies) but rather is the consequence of an actual and innovative female role-model intervention implemented by a foundation with continuity over time and international expansion. Indeed, this program is currently being spread to many countries around the world (the United Kingdom, Spain, Serbia, Switzerland, Singapore, Italy, Mexico, Costa Rica, Chile, Peru, Brazil, Honduras, and Panama). These role-model sessions are carried out with actual successful women volunteers that are experts in their fields and are willing to collaborate with the program, and we consider that this creates an atmosphere of closeness and warmth that is ideal for the girls to interact directly with the role models and dare to share their doubts and concerns regarding the male-dominated domain of STEM careers.

The present research has immediate practical applications because the conclusions of this study will allow the IGF to improve the effectiveness of its role-model program. Taking into account the results obtained, the sessions would be enhanced significantly if they were focused especially on the counterstereotypical skills and abilities that are needed to pursue a STEM career, along with information about job opportunities in the new age of automation, the social and practical contributions of STEM fields, and the possibility of achieving work–life balance.

Practical Implications of the Present Research

The findings from the present study also have practical implications. This study shows the effectiveness of the role-model sessions in terms of reducing gender stereotypes, increasing enjoyment and importance-related values as well as expectation of success, and strengthening the direct effect of expectancies of success on girls' STEM choices. This research thus demonstrates the benefits of role-model sessions in increasing STEM intention of enrollment among young girls, and thereby suggests a promising method of increasing the number of STEM graduates to meet the growing need for STEM professionals.

An increase in women's presence within STEM professions is particularly important so as to enable women to seize the new opportunities offered by digital transformation. If women continue to be underrepresented in STEM fields oriented to the design and production of digital technologies, they may fall further behind in the labor market. The World Economic Forum [WEF] (2020) suggests that there is an urgent need to increase the supply and visibility of women with technical skills to close the gender gap in the professions of the future.

In this regard, Madgavkar et al. (2019) estimate that, globally, between 40 million and 160 million women (7–24% of those currently employed) may need to transition between occupations by 2030, often into higher-skilled roles. To make these transitions, women will need new skills. In

particular, they will need to overcome their low participation in STEM fields compared to men, as an important barrier that, if not broken, will make it harder for women to make transitions. Policymakers and organizations must step up interventions targeted especially at women, such as addressing stereotypes about occupations and supporting women in STEM professions, which is precisely at the core of the studied role-model sessions.

Although not the main objective of the program, an important positive spillover of these interventions has to do with addressing the issue of vertical sex segregation. This is relevant because, according to the literature, increasing women's visibility and power in male-dominated occupations will reduce the persistent gender stereotyping, discrimination, and perceptions of lack of belongingness and interest that pose barriers to women's representation in managerial roles (Gaucher et al., 2011; Skaggs et al., 2012). This potential benefit could come from the fact that many female role models who participate in the sessions are successful professionals who have broken the glass ceiling (i.e., they have been promoted into the upper echelons of their organization). Indeed, some of the strategies that have been posed for fostering greater equality and gender integration in the workplace are focused on the supply side (i.e., women) and include efforts to increase women's interest in male-typed occupations, such as leadership positions and/or male-dominated STEM fields, through programs targeted at precollege girls to develop their confidence and challenge the cultural contexts that restrict the spectrum of self-beliefs they find acceptable and desirable in gendered ways (Eccles, 1994; Cech et al., 2011; Cech, 2013).

The present research, along with widening the professional horizons of young girls and fostering their interest in male-dominated professions such as STEM careers, shows that these type of intervention could have a positive impact in raising girls' aspirations by reducing stereotypes about women's suitability for leadership positions in STEM (Kanter, 1977; Richman et al., 2011; Beasley and Fischer, 2012). Male-dominated STEM careers are frequently associated with decision-making positions (Sáinz et al., 2019).

Nevertheless, other scholars (Seron et al., 2018) claim that promoting greater gender integration alone to effectively raise the low proportion of women in STEM fields is unlikely to achieve cultural change. Indeed, Seron et al. (2018) argue that these types of actions on the supply side would effectively raise the number of women entering STEM careers, but they would not guarantee their persistence in STEM fields, especially in the presence of several structural–cultural factors of women's marginality, such as the hegemony of the meritocracy and the role of a professional culture that drives token experiences. In this last case, supply-side interventions should be complemented with demand-side actions such as diversity programs by policymakers and companies to ensure that women are equally represented in all phases of the talent pipeline, as recommended by the World Economic Forum [WEF] (2020).

Finally, all these measures should be accompanied by a learning and social environment that promotes the reduction of sexist attitudes and helps to configure a world without stereotypes

(Solbes-Canales et al., 2020). Only in this way can the next generation of potential female scientists believe that they can achieve a successful STEM career.

Limitations and Directions for Future Research

The present results are based on a survey with self-selected schools, and it would be desirable to use a larger sample of schools to reinforce the statistical validity of the results obtained. However, because this is a real and non-laboratory-based study, the design of the sample procedure is beyond the reach of the researcher, who is limited to collecting data in the real environment in which the program is being implemented. Second, and as a consequence of the previous limitation, it could be argued that the results reported in this study are bounded in the sample and might not reflect the patterns of the overall population of young female adolescents in Spain regarding the motivational factors that drive their underrepresentation in STEM fields and the effectiveness of the role-model interventions in these fields. However, the schools that went through the role-model sessions included several regional and socioeconomic varieties, including both public and private schools, giving a relatively diverse sample. Third, the effect of the counterstereotypical content offered by the role models during the sessions in the female adolescents' career choices suggested by the theoretical model would need to be explored further over a longer period of time, with longitudinal data. This could be carried out through a third-wave survey, at least 3 months after participants attended the role-model sessions, to evaluate their possible residual effect. To do this, it would be necessary to have a larger sample because of the revisable high drop-out rate.

The IGF has developed a new means of exposure to role models through videos, which is easier to implement than face-to-face sessions. It would be interesting for future work to understand which of the two types of intervention is more effective, as the video library has important advantages in terms of cost-effectiveness and time flexibility. The findings from the present study suggest other promising directions for future research. Future work could consider expanding upon the current research with a longitudinal study with repeated exposure to role-model sessions. This would facilitate understanding of the long-lasting effects of role-model exposure. Additionally, because the IGF has started a process of international expansion, mainly in Latin American countries, it could be interesting to evaluate the influence of these role-model sessions across different cultural settings.

Further research should also incorporate a control group of female students who, being in possession of the same features as the final participants, have not been involved in the role-model sessions. This would be key for generalizability, although this has to be done carefully because of ethical concerns about the injustice of omitting a group of girls who could have benefited in the future by attending these role-model sessions.

The IGF does not want to discriminate against a group of girls for study reasons. The measurement of STEM choice as a global compendium of different STEM disciplines could be another limitation, this being because the content and objectives of engineering as a discipline (although related) are not the same as those of physical science, computer science, and math. The interest of female students in pursuing physical science could thus be different from their interest in math, computer science, or engineering.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation, to any qualified researcher.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Marta Pérez-Dorao (Fundación Inspiring Girls) Carmen Calderón (Universidad CEU San Pablo) Mirian González Durántez (Inspiring Girls Chair). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

AUTHOR CONTRIBUTIONS

RM, SG-P, and MS designed, performed, and analyzed the research, searched literature, and wrote the manuscript. All authors contributed to the article and approved the submitted version.

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Parent and Teacher Depictions of Gender Gaps in Secondary Student Appraisals of Their Academic Competences

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The present study examines a group of secondary teachers' and parents' appraisals of gender gaps in secondary students' self-assessment of competence in Science, Technology, Engineering, and Mathematics (STEM) and non-STEM domains. Eight focus groups with 39 parents and 34 secondary teachers were conducted for this purpose. In light of the observed gender gaps in students' performance and self-perception of ability in the different subject areas, the participants were particularly surprised by girls' underestimation of their abilities in STEM subjects, compared with boys' tendency to overestimate their abilities in STEM. Most participants agreed on the need for measures to combat these inaccuracies and discussed possible causes. Some participants associated these gender disparities in students' self-assessment of ability with gender gaps in their choices of subject areas and occupations. The role played by school, teachers, families, and other socialization agents in reinforcing gender stereotypes about academic competence was also discussed in most of the focus groups. Interestingly, some teachers questioned why gender attainments obtained in schools do not serve as an example when it comes to neutralizing the sexism and gender inequality messages offered by the media and society. Likewise, technology teachers proposed changes in school practices to close gender gaps in certain areas (i.e., boys' appropriation of the playground, or the reproduction of gender roles in the classroom). Few parents acknowledged their unconscious reproduction of gender roles and stereotypes in raising their children.

Keywords: gender, self-perception of ability, socialization, stereotypes, STEM

INTRODUCTION

A recent meta-analysis of studies carried out between 1914 and 2011 in more than 30 countries (70% of the sample comprised students from the United States) concluded that girls have systematically achieved higher academic performance than boys for nearly a century (Voyer and Voyer, 2014). This study also concluded that, though boys tend to score higher in math and science on standardized tests such as the OECD's PISA test, girls achieve higher

school grades in all subject areas (Voyer and Voyer, 2014). Interestingly, the female advantage in school performance in math and science seems not to become apparent until junior or middle school (Voyer and Voyer, 2014). According to this meta-analysis, the widest gender differences were reported for language courses and the narrowest gap was recorded for math and science. These differences increased from elementary to middle school but declined across post-secondary compulsory school (Voyer and Voyer, 2014).

The generalized nature of the female advantage in school performance contradicts the existing stereotypes that girls excel exclusively in languages, while boys only excel in math and science (Tiedemann, 2000; Skaalvik and Skaalvik, 2004; Sáinz and Eccles, 2012). According to a recent study, girls' better use of extra time at the end to finish tests on account of their ability to sustain performance can explain gender differences in score performance (Balart and Oosterveen, 2019). Unfortunately, according to Voyer and Voyer (2014), women's better performance over that of their male counterparts throughout compulsory schooling in most countries has received little attention as a global phenomenon.

To the authors' knowledge, there is currently a lack of research into parents' and teachers' views of these gender differences. In order to fill this gap in the literature, this qualitative study aims to analyze the opinions of parents and teachers on this issue.

Gender Disparities in Students' Appraisal of Their Academic Abilities

Young people's self-perception of ability plays a major role—even higher than actual performance—in shaping boys' and girls' choices (Sáinz and Eccles, 2012; Bian et al., 2017). According to the expectancy-value theory of achievement motivation, students will choose courses of study for which they have an expectancy of success and which have a high value for them (Eccles, 2007). During recent decades, much research has been devoted to evaluating students' discrepancies in self-assessment of their academic competences in different subject areas (Guimond and Roussel, 2001; Gonida and Leondari, 2011; Sheldrake, 2016). Some of these studies have examined gender disparities in the way girls evaluate their abilities in Science, Technology, Engineering, and Mathematics (STEM) subjects such as math, technology, and physical science (Sáinz and Upadyaya, 2016; Sheldrake, 2016). In this regard, girls tend to systematically undervalue their academic competences in STEM domains such as math, physical science, and technology, despite the fact that their scores are equal or higher than those of their male counterparts (Sáinz and Eccles, 2012; Sáinz and Upadyaya, 2016; European Parliament, 2020). Strikingly, boys tend to consistently overestimate their competences in these STEM subjects (Guimond and Roussel, 2001; Sáinz and Eccles, 2012).

The field of STEM has been the focus of an immense body of research into gender gaps in self-perception of ability. There is a widely held belief that STEM degrees and careers are difficult and that a student needs to be brilliant to enter and succeed in these fields (Shin et al., 2016). These gender differences in perception of intellectual ability emerge at an early age (Bian et al., 2017).

Six-year-old girls were more likely to attribute brilliance to males and less likely to report interest in the game labeled for brilliant children than in the one labeled for hardworking children. If girls do not see themselves as clever enough for STEM, they will not develop interest in STEM subjects. This could explain why girls do not enroll in studies and occupations requiring high mathematical abilities, despite having the potential to do so. If women are to engage and take an active role in STEM disciplines, then it is crucial to change women's and girls' self-perception of ability (Wang et al., 2017) and self-efficacy (Adams et al., 2014) in relation to STEM, especially in areas where women have traditionally been underrepresented such as technology, physical science, and computer science.

Students' accuracy in the evaluation of their academic competences predicts different motivational indicators, such as students' interest in science and STEM (Sáinz and Upadyaya, 2016; Sheldrake, 2016), performance in various subjects (Bouffard et al., 2011), or achievement goal orientations (Gonida and Leondari, 2011). However, to the authors' knowledge, there is a lack of research into the ways in which parents and secondary school teachers interpret these gender gaps in students' evaluation of ability in different domains, particularly in STEM subjects. Gaining further understanding about these issues may help promote more realistic assessments of students' abilities and prevent girls and boys from having negative and positive respective beliefs about their potential in STEM subjects.

Gender Socialization Influences of Parents and Teachers on Students' Appraisal of Scholastic Competences

Individual differences in competence beliefs, cognitive capacity, and interests are shaped by students' experiences in broader sociocultural contexts, at home and school, for example (Eccles, 2009). Gender-role socialization can lead females to have less confidence in their abilities than males (Eccles, 1987, 2007). For instance, parents shape their children's perception of their ability, thus influencing the choices they make, by providing dissimilar messages about their ability in different domains (Frome and Eccles, 1998; Eccles, 2007).

Research into the socialization of expectations like the expectancy-value theory of achievement motivation has tended to focus on attributional processes and on the differential treatment received by boys and girls, at home and in the classroom (Eccles, 1987, 2007). According to this research, many parents and teachers draw on gender stereotypes regarding boys' and girls' abilities, and they communicate these beliefs through various indirect and explicit behaviors (Frome and Eccles, 1998; Eccles, 2007). Girls are therefore considered to be better at English than boys, whereas boys are considered to be better at math and other STEM domains (Eccles, 1987; Sáinz and Eccles, 2012; Sáinz and Upadyaya, 2016). In addition, girls are thought to work harder to master math and other STEM subjects than boys, and vice versa for languages. These gender-differentiated beliefs persist even when school performance levels are controlled (Eccles, 2007). Moreover,

students' self-concepts in different subject areas may also be affected by the extent to which they receive recognition of their achievements or encouragement from teachers, family, and friends to excel at different domains. Girls often tend to receive less recognition and encouragement than boys (Mujtaba and Reiss, 2012).

In addition, teachers as well as students and parents may hold different beliefs about intellectual abilities (Bursuc et al., 2011). Some may believe in the so-called fixed mindset, whereby people have different levels of intellectual ability which are basically unchangeable and cannot be modified through effort. Others may believe in the growth mindset, according to which intellectual abilities can be cultivated and developed through effort and instruction (Dweck, 1999). It is therefore likely that parents as well as teachers also differ in their beliefs regarding the origins of individual differences in competence, the meaning of failure, and the most adaptive responses to failure (Eccles, 2007): "These beliefs should influence both their response to children's failures and their efforts to help boys and girls acquire new competencies and interests" (Eccles, 2007; p. 673).

On the other hand, teachers' expectations of pupil performance have a major impact on their pupils' final scores, as observed in the classical experiment conducted by Rosenthal and Jacobson (2003), who coined the term "Pygmalion effect" to observe the influence of self-fulfilling prophecies. Jussim et al. (1996) found that teacher expectations had a significant effect on sixth-grade students' grades and performance on a standardized mathematics test. Teacher expectations were lower for girls and low-income students. When teachers hold high general expectations for student achievement and students perceive these expectations, students perform better and experience a greater sense of competence as learners (Eccles et al., 1998; Eccles, 1999). In addition, there appears to be a correlation between greater parental encouragement to study math and science and enrollment in advanced math courses, greater interest in math and science, and higher math and science achievement, all of which are predictors of postsecondary education decisions and eventual STEM professional employment (Simpkins et al., 2012; Wang et al., 2017).

Social, Environmental, and Biological Influences

The impact of stereotype threat is one of the social factors explaining gender differences in school achievement. According to this theory, fear of confirming negative stereotypes about girls' low competences in math leads girls to perform according to those negative beliefs (Steele, 1997). For instance, teachers who endorse the stereotype that boys are worse at reading or languages than their female counterparts may be less inclined to provide male learners with educational opportunities and resources or motivate male learners to achieve in these areas (Riley, 2014). Similarly, the assumption that girls try harder in school is a positive stereotype that rests on the idea that schools are a better fit for girls than boys. Teachers who hold this positive assumption may behave accordingly and implement educational measures that facilitate girls' engagement in school.

A number of environmental variables are also associated with symbolic and physical factors that shape the development of gender roles and stereotypes within the school context (Solbes-Canales et al., 2020). From a symbolic perspective, textbooks, teachers, and other educational tools may transmit subtle and implicit messages about what is expected of each student in terms of gender and other sociocultural factors such as parental educational level, social origin, or ethnicity. This is best known as the hidden curriculum (Basow, 2004; Asadullah et al., 2019). Additionally, the physical distribution of the classrooms, spaces, and objects within a school also seems to reproduce the gender differences present in society (Børve and Børve, 2017; Lyttleton-Smith, 2019). Boys, for instance, tend to make greater use of public spaces like playgrounds, engaging in leisure and sporting activities such as football, whereas girls occupy less space in the playground when they play (Karsten, 2003; Clark and Paechter, 2007).

Studies focused on brain differences between boys and girls have shown no statistically significant differences in motivation levels toward science learning between male and female students (Zeyer and Wolf, 2010). However, highly significant differences between personality attributes were observed: female students were more likely to be empathizers (possessing the ability to identify and perceive the mental states of others), and boys were more likely to be systemizers (possessing the ability to understand the world in terms of a system). Students that were more likely to be systemizers possibly had a greater motivation to learn science than empathizers, and the fact that male students were more likely to be systemizers could explain the observed gender differences in male and female students' choices in relation to STEM.

Given the influence of their beliefs and expectations, together with teachers' instructional practices, on young people's achievement and self-perceptions of ability (Eccles, 2007; Wang et al., 2017), understanding the views of teachers and parents is an important step in identifying strategies for reducing gender gaps in school achievement and self-perception of ability. The purpose of the present study is, therefore, to examine parents' and teachers' views of gender differences in school performance, self-perceptions, and the poor fit between performance and self-perception of ability. While most of the existing studies addressing these topics have been conducted with self-reported surveys targeting mostly primary and secondary students (Tiedemann, 2000; Bouchey and Harter, 2005), there is a lack of qualitative research providing in-depth analysis of the views of parents and teachers. In order to fill this gap in the literature, we carried out a qualitative study with focus groups addressing the following research questions:

R.Q.1: What are parents and teachers' views on gender differences in students' school achievement and self-perception of ability across subject areas?

R.Q.2: What are the differences and similarities between parents' and teachers' views on these issues?

R.Q.3: In what ways do the views of teachers in STEM disciplines differ from those of other teachers in non-STEM disciplines?

MATERIALS AND METHODS

Design

A qualitative study was carried out using focus groups. Focus groups were chosen over individual interviews because of their suitability in terms of promoting synergy and enabling meaning-making through dialogue between the study participants. In accordance with their socially oriented nature (Krueger and Casey, 2014), focus groups allowed us to generate interactive contexts of discussion between teachers and parents on the topics of school achievement and adolescents' self-perception of their abilities. In these interactive contexts, both groups of participants were able to build on their own individual views and experiences and connect them with those of the other participants (Morgan, 1996). Focus groups were productive in eliciting a range of social expectations and norms of teachers and parents, and expressions of agreement and disagreement within and between the groups. These focus groups were conducted between 2016 and 2017 as part of a larger, quantitative, 6-year longitudinal study aimed at examining the development of gendered pathways across secondary school years.

Participants

Purposive sampling was used to recruit secondary school teachers working at four secondary schools in Madrid and two in Barcelona. Parents of adolescents attending these six schools in the last year of junior high/secondary school were also recruited. We focused on students at this academic level because it is a crucial point in the Spanish educational system, at which students opt for one or another branch of further education. Participants meeting the inclusion criteria were recruited through parent associations and school principals and counselors, who informed them about the study objectives and asked whether they were willing to take part in the study. Following the sample size recommendations in the literature (Guest et al., 2017), a total of eight focus groups were conducted: four of the focus groups were comprised of parents ($n = 39$), and the other four were made up of teachers ($n = 34$). All the focus group samples were homogeneous, that is, composed entirely of either teachers or parents, to ensure the building of shared views. Six focus groups were held in Madrid and two in Barcelona. The characteristics of the participants of each focus group are shown in **Table 1**.

Procedure

The focus groups were facilitated by the principal investigator in quiet classrooms during the evening, after classes were finished, and lasted between 50 and 90 min. Participants received no compensation for their participation. All the focus groups had the same structure. Prior to each focus group session, participants in both groups answered a brief, anonymous, sociodemographic questionnaire eliciting their age and type of studies attained. In addition, while teachers were requested to report the subjects they taught, parents were requested to inform about the number, gender, and age of their children. All the sessions began with a brief introduction of the study aims given by the facilitator, after which a sheet containing two tables was distributed among the

participants. The first table included information on the students' final grades in different subjects, separated by gender, based on information from the 2015–2016 academic year provided by the schools (see **Supplementary Appendix Table 1**). This table showed that, on average, girls performed better in all subjects, including those traditionally considered masculine, such as mathematics, technology, and physics. The second table contained data from the previously mentioned larger quantitative longitudinal study, showing the mean differences between boys and girls in their self-perception of ability based on a 7-point Likert scale (see **Supplementary Appendix Table 2**). This table showed that boys had a higher estimation than girls of their own abilities in subjects such as mathematics, physics, chemistry, and technology. Using these tables as the main basis of discussion, the focus groups were guided by open-ended questions designed to engage teachers and parents in discussion about the differences between male and female secondary students' school achievement and self-perception of ability in different subject areas. The focus-group protocol included three broad categories of questions. In the first question, participants were asked to discuss their views on the data shown in the tables and how realistic they perceived this data to be. In the second question, participants were asked to list the subjects in which they thought each gender performed best. In the third question, participants were asked to give their opinion on the extent to which sexist beliefs about academic performance prevail in the classroom and in which subjects these beliefs are most prevalent. The same interview guide was used in all eight focus groups, all of which were audio-recorded and transcribed by a professional transcriptionist. The ethical study procedures were approved by the Institutional Review Board of the Universitat Oberta de Catalunya, and prior informed consent was obtained from the participants.

Data Analysis

Data-driven thematic analysis on the interviews was carried out, following the approach described by Boyatzis (1998). Thematic analysis is especially suited for studies which address exploratory research questions, since the themes derive from statements made by participants rather than being defined previously by the research team. Three researchers (JS, MS, and SF) participated in the data analysis, which was conducted in three steps. First, all the interviews were read several times by JS, who identified and summarized the main themes. These themes were transformed into codes, and each code was assigned a label, a definition, and inclusion and exclusion criteria. The content and structure of the code book was subsequently discussed with MS and SF to check for consistency between the codes and the summarized themes. Any resulting disagreements between the three researchers were mediated through discussion and any necessary revisions were made. Second, the code book was imported into the software—NVivo 12 (QSR International, 2020)—used by JS to code the interview transcript. Text passages associated with the research questions were coded line by line by the researcher. Once the first stage of coding was completed, the codes were rigorously reviewed by MS and SF. Third, a reiterative approach was used to sort, collate, and combine the codes into main themes. The resulting themes were examined by MS and SF to confirm their

relevance to the research questions. Finally, the “matrix coding query” function of NVivo was used to identify patterns in the coded data across the study participants. This last step allowed us to establish interpretive validity and within-case generalizability (Maxwell and Chmiel, 2014).

RESULTS

Gender Differences in Academic Performance

Thirty-five parents (29 mothers and 6 fathers) referred to this issue, compared to 5 out of 10 male teachers, 13 out of 24 female teachers, and only 8 out of 21 participants with a STEM profile. In general, both parents and teachers were somewhat surprised at the fact that girls reported higher scores in all subject areas. They recognized that gender differences are higher in subject areas that require more dedicated study, such as biology, geology, and social sciences, or those that require verbal competences, such as Spanish, Catalan, and English.

Above all in more academic subject areas that require study. Biology and Geology. Social Sciences. There is a difference of over [...] half a point, and look, of nearly one point. Biology and Geology, English, subjects associated with verbal skills. (Female school counselor, 52, Psychology graduate. FG3.)

However, both teachers and parents were particularly astonished to observe that girls have higher grades than their

male counterparts in subjects traditionally associated with masculine roles, such as mathematics, technology, physical science, and chemistry.

It is surprising. . . the belief that boys are much better than girls at mathematics or scientific subjects is not true. (Female teacher, 42, school counselor, Psychology graduate, 10 years teaching experience. FG1.)

Generally speaking, they referred to several factors to explain that girls show higher scores in all subject areas. In both groups, participants agreed that girls mature earlier than their male counterparts during the compulsory secondary school years. This maturity enables girls to be more constant and structured; they are more responsible, disciplined, and focused; manage their time better; take more interest in academic endeavors; and are more realistic with the educational setting and the importance they give to academic outcomes. Boys, on the other hand, are more absent-minded.

They are more constant in their studies and demand a bit more from themselves. This can be associated with that maturity level. They reach that maturity level earlier. (Mother, 53, nurse, with one daughter. FG6.)

According to most teachers, these differences in school performance tended to diminish in post-compulsory secondary education (in Spain, Baccalaureate), when boys' and girls' performances even out.

TABLE 1 | Characteristics of focus groups participants.

Demographic	FG1	FG2	FG3	FG4	FG5	FG6	FG7	FG8	Total
Gender									
Male	1	2	3	3	4	1	0	2	16
Female	5	5	7	6	7	9	9	7	55
Education									
Primary	0	0	0	0	2	0	0	0	2
Secondary	0	0	0	0	4	3	2	3	12
University	6	7	10	9	5	7	7	6	57
Type of major									
STEM	1	3	0	3	3	5	3	3	21
Non-STEM	5	4	10	6	8	5	6	6	50
Type of participant									
Parent	–	–	–	–	11	10	9	9	39
Teacher	6	7	10	9	–	–	–	–	32
Years working as a teacher (only for teachers)									
Less than 15 years	3	1	1	1	–	–	–	–	6
More than 15 years	3	6	8	8	–	–	–	–	25
Number of children (only for parents)									
One child	–	–	–	–	5	2	5	4	16
Two children	–	–	–	–	6	5	4	5	20
Three children	–	–	–	–	0	3	0	0	3
Gender of children (only for parents)									
Only male	–	–	–	–	4	3	4	2	13
Only female	–	–	–	–	4	2	5	5	16
Both sexes	–	–	–	–	3	5	0	2	10

I think that, during ESO [Spanish compulsory secondary education], this is clear, except for some boys who are very good and are able to perform well. But the girls perform better on average [...]. I don't know, I have the impression that, during ESO, boys do not take much interest whereas, in Baccalaureate, at least the brightest boys take more interest in what they do. (Female English teacher, 56 years old, 33 years of teaching experience. FG3.)

In some of the groups, a small number of participants discussed the idea that girls tend to study more and are more inclined to have more of a "culture of endeavor" than their male counterparts. However, for some participants, these gender differences in school performance were not attributable to boys' lack of effort.

I believe there is a big difference in the way they work, but not a lack of effort in boys. (Mother, 46 years old, computer scientist, one son and one daughter. FG6.)

Other participants discussed biological and anatomical brain differences between men and women, which led to discussion of types of intelligence and the assertion that girls possess greater emotional intelligence than boys, while boys have greater problem-solving intelligence. According to the following testimony of a language female teacher, these different types of intelligence predisposed girls and boys to achieve different competences, even in areas like language, in which women are supposed to excel.

[...] girls' emotional intelligence helps them to acquire a higher level of language than boys, in the aspect of the subject related to giving opinions and expressing emotions, or reasoning. Emotionally speaking, girls are more mature than boys. However, when it comes to my subject [...] the gender gap gets smaller. Part of this subject requires that intelligence be focused on problem-solving. And the boys do better in these tasks, they are able to do them better. (English teacher, 55 years, with 34 years of teaching experience. FG2.)

Some participants in both groups questioned their role as part of the socialization process that promotes this division of roles outside school hours, whereby girls are encouraged to study, engage in responsible activities, and over-perform, while boys are encouraged to be more proactive, empowered, and oriented to competitiveness through activities like sports or playing video games.

[...] girls have been steered toward study, whereas boys are encouraged to do more things [...]. For instance, they do more sport, play video games. (Mother, 47, customer care agent, with two daughters. FG8.)

Gender Differences in Self-Perception of Ability

The participants raised several aspects associated with motivation to explain the observed gender differences in self-perception of ability. For instance, they commented that boys were more interested in subjects related to science and technology, or that they felt more competent than girls in these subject areas. Girls, on the other hand, seemed to feel more insecure, less competent,

and comfortable and had less self-esteem than boys in these subject areas. As stated by one female teacher of Spanish, whereas boys grounded their self-confidence in their capacity, girls' self-confidence was based on their endeavor (hours of study). This demonstrates that boys have a higher self-confidence in their intellectual capacity.

I believe that boys are more positive, have greater confidence in their intelligence. Among boys, there is feeling that there is no need to study; boys have confidence in their ability. Girls base their confidence on how much they study. (Teacher of Spanish, 56, 33 years of teaching experience. FG3.)

However, technology teachers recognized that girls were frequently attributed less competence by their male peers in the most technical activities developed in the classroom. According to these teachers, attitudes like these led girls to internalize that they were not capable enough to develop technological tasks in practical sessions like the ones in the workshop. The following ideas expressed by a female Technology teacher illustrate the existence of these prejudices about girls' lack of technological competence.

It is true that when it comes to using the machines [...], the girls, in general, remain withdrawn and think that they could not do it. Many times I have had to call the boys out for saying, "I don't want to work with girls because they don't know anything." And I look at them and reply, "Okay, and what am I? I am a woman who teaches you technology." And they reply, "Well not you, you're the teacher." There is still a lot of prejudice in technology, in the workshop, in relation to women supposedly having no technological competences and the worst of it is that girls just assume they do not have enough technological competences. (Female technology teacher, 47, Physical Science graduate, 22 years of teaching experience. FG4.)

For some participants, girls' lower self-perception of ability in STEM was also associated with societal expectations and how these were higher for women than for men.

Expectations are greater for women because I believe that society influences us and we are told we have to work harder to achieve the same results. This is something that our mothers have probably unconsciously instilled in us. (Mother, 56, nurse with one daughter. FG4)

The promotion of different skills in boys and girls together with the disparity of social expectations becomes salient in subjects and activities associated with masculine gender roles, such as technology. In this context, sexist patterns of behavior are reproduced in the classroom. Boys tend to take the initiative, whereas girls self-exclude themselves from participating.

[...] Purely academically speaking, when pupils are working in a team, if I leave the tool kits on the table in a mixed group, the hammer and the saw, a girl never picks them up. That is, in order to have equality-based learning, I have to intervene [...] Not because he knows more, but because the keyboard and the mouse have to be shared and the boy will take the initiative. Because we live in a society that fosters initiative in boys and reflection in girls. (Technology teacher, 48, Physical Science graduate, 16 years of teaching experience. FG2.)

Some mothers in a group of only mothers acknowledged that they sometimes unconsciously demand more from their daughters and are more tolerant with their sons. In their view, the gender socialization received during childhood influences the “not always conscious” reproduction of certain gender inequalities.

Well, we have experienced that with our own children, but we are trying to fight it. Although I try to treat my two children the same, I have realized that I sometimes don't. Unconsciously, my own experiences, the way I was raised, make me more tolerant with my son than with my daughter and I demand more from my daughter. I sometimes find it hard. (Mother, 46, psychologist, with one son and one daughter. FG8.)

This disparity of gender socialization demands can also be observed in social media such as Facebook or Twitter, publicity, and the mass media, where messages congruent with gender roles and stereotypes are frequently addressed to boys and girls.

Last week I saw an article on Facebook about a study with primary children who observed posters advertising products targeting men and women, and looked at people's perception of the men and women depicted in those posters. Women were depicted in terms like “sad,” “skinny,” “nobody loves her,” “she has been beaten,” and so on. And men were described in terms like “I want to be with him,” “Wow, so handsome,” “Look how confident they are” (Mother, 46, psychologist, with one son and one daughter. FG7.)

Some teachers questioned the role played in all this by schools and, by extension, themselves, given their ongoing beliefs regarding the prevalence of family education. One female teacher affirmed that, in transversal subjects like languages (where the incorporation of topics like racism or gender is frequent), the opinion of the family prevails.

The ideas that they have at home about racism, gender, and other topics are those that prevail. In most cases, not 100%, you do convey something to them, but what they experience in their family always prevails, in subject areas traditionally associated with the feminine gender role, like languages. (Female guidance counselor, 55, 27 years of teaching experience. FG4.)

Several participants discussed the weight of biological factors (instinct) versus those associated with “social DNA” to explain existing gender gaps in students' perception of competence in different subject areas, and the implications that this could have when they conduct any concrete measure on aspects supposedly biologically marked.

There are two aspects, social and biological, right? So one can intervene and develop multiple tasks and activities and plan projects to attempt to minimize these differences. That is at a societal level, though I am not sure of the impact on society and how it will turn out. There is something in social DNA. But then, the biological issue, and for me the most important issue, is that equality rests also on understanding the difference [...] I don't know to what extent we should demonstrate the biological implications of all these. I can strive to ensure that someone picks up the hammer, a person who by instinct does not want to do it. Then, I could decide to intervene in a thousand aspects, but maybe I am also conditioning that person's happiness. Maybe I will make that person unhappy, because that person (a girl or a

boy) by instinct does not want to pick up the hammer [...]. (Male Physical Science and Chemistry teacher, 38, Chemistry graduate, 11 years of teaching experience. FG2.)

At the same time, according to the views of a group of female teachers and a few parents, girls were more motivated to achieve good academic results, whereas boys settle for passing. This leads girls to make high demands of themselves and invest more effort in schoolwork than their male counterparts. In addition, because girls are perceived as hard workers when they achieve good grades, they too put their results down to hard work.

I used to get good grades, but I did not consider myself clever, I considered myself a hard worker. (Mother, 43, Cinema and Advertising graduate, with one daughter. FG7.)

Most of the teachers and parents agreed on the need for measures to change and improve girls' self-perception of ability in STEM subject areas traditionally associated with masculine roles, such as technology or the “hard” sciences. A few teachers also believed that it is key to correcting boys' overestimation of their competence in STEM domains.

I believe that what we have to work on is improving girls' perception of their ability in math, physical science, and chemistry, and technology. Because [...] this is a problem of perception, and perception can be corrected. Girls must be aware of this. (Father, 52, university teacher, with two sons. FG6.)

Across all groups, several solutions to be developed within the school context (starting from primary school) were discussed to resolve these gender disparities in students' self-appraisal of ability. For instance, acting on the distribution of school spaces in the playground, not allowing boys to take ownership of these spaces to play football or engage in any activity that involves movement, relegating girls to a smaller space to talk or engage in activities with few movement opportunities.

I believe that school, of course during high school, but above all in primary school, should be the target of this work. From not letting boys occupy the playground playing football, leaving the girls with a corner, to the school, the classroom itself, so that when a female student performs well or does something that shows her knowledge on a topic, teachers acknowledge it publicly and empower her, and don't tell her, “Return to your seat.” (Mother, 43, Cinema and Advertising graduate, with one daughter. FG7.)

Equally, the role of teachers in combating the reproduction of social roles in traditional areas like technology was also discussed. In this context, technology teachers acknowledged that, in the face of girls' underestimation of their STEM competences, they can play an important role in setting up practical interventions to raise girls' self-esteem and self-consideration of their STEM abilities.

There are very good people, who do not consider themselves good because of the influence of gender, and I think I can intervene there. This happens in Technology [...]. I have to encourage girls, whereas I have to tell some boys that they are not quite as fantastic as they believe. (Male technology teacher, 49, Physical Science graduate, 24 years of teaching experience. FG2.)

In addition, a number of teachers questioned why schools are not offering a paradigm to neutralize the sexist, gender inequality messages that young people receive from different sources, such as the mass media. Accordingly, these societal messages reinforced the idea that what men do has a greater value than what women do, despite many women occupying jobs of responsibility in educational institutions.

It strikes me very much that schools do not play a more paradigmatic role, since we have increasingly been seeing many women present in education, more women holding posts of responsibility. In the previous managerial team, the director and the academic secretary were women. There are more female heads of department than males. Unfortunately, this has not had exemplary value because they continue to have sexist attitudes, even in the classroom, in the way they treat each other. Then the images they receive from society, the mass media and, I believe, other realities, is that men have a superior value to women [...] Men continue to rule, men hold the highest positions in government, the Supreme Court, and this [referring to women holding positions of responsibility in education] does not permeate into society. (Male Spanish teacher, 45, 28 years of teaching experience. FG4.)

On the other hand, mothers and fathers deliberated about the important role that families play in counteracting the weight that society has in the transmission and reinforcement of gender inequalities.

As mothers we can transmit much to modify the stereotypes that are clearly shown in the surveys. We have to start working individually [...] We have the theory, but then the collective unconscious, that social model, is more present than we wanted, which tells us we should never let our guard down and remain vigilant [...] There is still much work to do to counteract it all. (Mother, 49, primary school teacher, with one daughter. FG7.)

Inconsistency Between Actual Grades and Self-Perception of Ability

Only two out of 10 ten male teachers commented on this aspect. Similarly, only five out of 24 female teachers, ten out of 32 mothers, two out of seven fathers and five out of 21 participants in STEM tackled the issue. A number of fathers and mothers were especially astonished at with boys' and girls' predisposition to respectively underestimate and overestimate their abilities in traditional masculine subjects like technology, physical science, and chemistry, while their grades reflected the contrary.

To me, what is striking, and I like it, is that this happens in those subjects we think boys are better at than girls, such as mathematics. (Mother, 52, lawyer, with one son. FG7.)

To explain this discrepancy, mothers in most groups mentioned the prevalence of stereotypes and traditional gender roles. For instance, the perception that boys are more suited to sciences than girls was associated with the belief that boys are more competent in STEM than girls.

That is, it is viewed more favorably that boys enroll in scientific studies, and so we become convinced that boys have more of the qualities needed for science, when it is not a proven fact.

(Mother, 57, Biology graduate, environment expert, with one daughter. FG7.)

Both parents and teachers agreed on the idea that raising girls' self-perception of ability and self-esteem, in both academic and the family settings, would be essential to change these gendered predispositions. However, some teachers also remarked on the need to work on changing boys' overestimation of their STEM abilities.

It is key that boys tend to perceive themselves as better, when their grades reflect the contrary. (Male Philosophy and Ethics teacher, 65, Philosophy graduate, 35 years of teaching experience. FG4.)

Parents and teachers granted that this discrepancy between grades and self-perception of competence provides an explanation for existing gender differences in decisions relating to courses and academic itineraries. That is, girls opt for biology and language-related subjects and itineraries, whereas boys choose science and technology-related subjects and itineraries.

Why do more boys choose technology than girls? I believe that the level of abstract and logic reasoning is more tied to gender and I don't know how to explain whether it comes from early education. A high percentage of boys, when you launch the topic for a project, "We are going to do this," they are the first to look for ideas, whereas the girls do nothing. (Female Technology teacher, 45, Engineering graduate, 16 years of teaching experience. FG2.)

In this regard, a number of teachers commented that parents' opinions carry greater weight than the students' own.

I am afraid that, if the family believes the girl is only worthy of being a hairdresser, you can tell them she can be an engineer she will not make it. (Male math teacher, 58, with 33 years of teaching experience. FG4.)

DISCUSSION

The present study contributes to the literature with a qualitative study of parents' and teachers' views of the persistence of gender stereotypes about boys' and girls' academic competences. For this reason, the engagement of the entire educational community, through both parents and teachers, in the fight against the prevalence of these gender stereotypes is crucial. These prejudices are harmful for everyone, but especially for boys and girls who do not fulfill societal expectations about their competences. The present research provides evidence of the fallacy regarding girls' low degree of science and technological competences, as well as the lack of truth in the assumption that all boys have the same high level of technological competence. In addition, teachers' and parents' opinions about the incongruence between self-perception of ability and school achievement, above all in STEM subjects traditionally dominated by men, is another major contribution of the present study.

The study further suggests that it will be essential, in Spain at least, to involve parents (particularly mothers, since they seem to play a more active role in the educational dynamic) and secondary teachers in the design and development of future research and interventions aimed at preventing students

from having biased ability self-concepts and promoting accurate ability self-concepts in both genders. However, empowering girls' participation and perception of ability in STEM domains and activities is critical if we are to attract and retain more women in STEM fields. The same would be true for boys in occupations oriented toward care provision or the humanities.

Gender Gaps in Academic Performance

The results of the present study demonstrate that many parents and teachers were not fully aware of the existence of gender differences in scholastic achievement and girls' better academic performance. They were especially surprised by the evidence of girls' higher performance in STEM subjects frequently associated with masculine roles.

They acknowledged that this gender gap occurred because girls work harder than boys, especially during junior secondary education, given that girls mature earlier. Some teachers also remarked that these gender differences in school performance tended to become smaller during senior secondary education. This line of argument reinforces postulates of the gender intensification hypothesis (Hill and Lynch, 1983). According to this hypothesis, following the commencement of puberty, changes in boys' and girls' appearance triggers increased social pressure from peers and adults to behave in traditional, gender-differentiated ways. This intensification disappears during mid- and late adolescence when adolescents are more flexible.

For some parents and teachers, these gender differences in school performance could also be associated with innate brain differences that may provide girls and boys with different intellectual abilities. Whereas girls have more emotional intellectual competences, boys have a problem-oriented intelligence. These traditional views of intelligence could be considered fixed entities in boys and girls by some of the participants (Dweck, 1999). This could have important implications for the way in which boys and girls conceptualize and calibrate their own talents, and the efforts they can make to develop and consolidate their different intellectual abilities.

Likewise, most parents and teachers discussed their role as part of the socialization process in the development of different gender roles associated with the importance attached by boys and girls to school achievement. However, there was no discussion of how they might contribute to changing the observed gender differences in school performance. This confirms other studies conducted in Spain (Sáinz et al., 2012), suggesting that teachers and parents should receive training with a gender perspective.

Gender Differences in Self-Perception of Ability

In light of the gender differences in students' self-perception of ability, many of the participants employed different personal and motivational arguments, such as interest, self-confidence, comfort, and self-esteem in relation to the different subject areas (Eccles, 2007, 2009). Remarkably, the debate was very much focused on the gap in self-perception of ability in STEM subjects that favor boys, such as technology, but not in those that favor girls, such as languages, or biology and geology. Interestingly,

a female teacher clearly explained how girls base their self-perception of ability and self-confidence on the effort they make, whereas boys do so based on their self-perceived capacity. This line of argument is congruent with research which draws on attribution theory and postulates that, whereas boys' achievement is more often attributed to capacity, girls' achievement is generally attributed to effort (Eccles, 1987, 2007). Mainly female teachers also discussed how, whereas girls in general learn to focus on schoolwork, boys convince themselves that passing is enough. This suggests that school should design interventions oriented toward addressing the difference in the value attached by adolescent girls and boys to school achievement.

Technology teachers, however, went further and recognized that girls' lower perception of ability in technology is associated with current prejudice about girls' technological competences (Sáinz et al., 2012, 2019; Shin et al., 2016). For these teachers, girls internalize this low expectation of their ability in STEM, turning it into a self-fulfilled prophecy (Jussim et al., 1996; Rosenthal and Jacobson, 2003). This view corroborates research on stereotypes about women's supposed lack of technical skills (Sáinz et al., 2019) and how the socialization of gender roles shapes boys' and girls' self-perceptions of ability (Eccles, 2007; Simpkins et al., 2012). In addition, according to many participants, girls' low self-perception of ability in STEM subjects was associated with the high expectations demanded by society of women in general. In other words, women have to try harder if they want to attain the same goals as their male counterparts, and this is applicable to all facets of our lives.

Participants also discussed the importance of gender socialization and how the dissimilar messages provided by different agents can be aligned with gender stereotypes that reinforce gender differences in self-perceptions (Eccles, 1987, 2007). Interviewing parents with children from both genders reflected on the way they behave differently with their children according to their gender. In this regard, some mothers recognized that they often unconsciously established unequal demands for daughters and sons. This confirms the findings of a recent scoping review which provided qualitative evidence of the particular importance of mothers in teaching and enforcing stereotypical gender roles, especially with their daughters (Kågesten et al., 2016).

In addition, the messages young people receive from the mass media (including social media) about different ways of depicting masculinity and femininity were also discussed. Whereas some of the participants questioned their role as parents or teachers in fighting against the transmission of stereotypical portrayals about academic competence, others seemed to consider that "other people" (not themselves) played a more important role than themselves in this (Sáinz et al., 2012).

A number of participants also discussed the interplay between biological and social factors in shaping gender differences in self-perception of STEM ability. In this respect, they discussed different ways to reduce these gender differences. All agreed on the importance of working on increasing girls' self-perception of ability in STEM (Sáinz and Upadyaya, 2016; Sheldrake, 2016), while some teachers also pointed out the need to

modify boys' tendency to brag about their STEM abilities (Guimond and Roussel, 2001).

Also worthy of attention is the way in which some teachers questioned the role played by schools and, by extension, themselves, in combating the gender roles and stereotypes present in current society. It is particularly interesting that they flagged up the fact that education (normally associated with feminine gender roles) lacks in social value compared to other sectors (like politics or economy), given that society attaches greater value to what men do as opposed to women. This might also explain why none of the focus groups discussed the implications of a deficit of boys in non-STEM fields such as the humanities, and how to encourage the participation of boys in professions oriented toward health and care provision, where the presence of women predominates.

It is interesting that a number of teachers and parents (especially those coming from technological fields) provided insightful guidelines for intervention that have also been identified in the literature, such as, for instance, preventing boys from taking control of school spaces such as the playground (Clark and Paechter, 2007; Lyttleton-Smith, 2019), or deterring boys and girls from assuming traditional roles within the classroom—for instance, in practical workshops in technological fields (Sáinz et al., 2012). Likewise, some groups of parents also discussed their role in changing boys' and girls' predisposition to respectively over- or undervalue their STEM abilities (Guimond and Roussel, 2001; Sáinz and Upadyaya, 2016). Unlike the teachers, however, they did not discuss concrete actions to employ at home to change these predispositions, though some did reflect on the need to modify societal stereotypes in the home.

Incongruence Between Self-Perceptions and Performance

The parents seemed to be more astonished than the teachers by the incongruence between self-perceptions and performance. They were particularly shocked by the predisposition of boys and girls to respectively over- or underestimate their competences in STEM subjects.

The prevalence of gender stereotypes about men's and women's abilities and traditional roles was a common topic for discussion in all the focus groups. However, though participants from the different groups questioned their own role in shaping accurate perceptions of boys' and girls' academic competences, teachers insisted on the importance of the role of families in shaping young people's self-perceptions of ability and academic decisions such as study choices (Sáinz and Upadyaya, 2016). Most of these decisions were taken in the course of secondary schooling, where social pressures to conform to gender roles are very salient (Eccles, 1987, 2007).

Most parents and teachers associated young people's inaccuracy in the evaluation of their academic competences (with a particular focus in STEM fields) with existing vocational segregation. That is, whereas girls are highly represented in STEM studies related to the provision of health, they remain underrepresented in technological STEM programs and physical science (Spanish Ministry of Education [MEFP], 2020). In this

regard, teachers affirmed that parents' opinions have greater influence over young people's study choices.

The fact that most of the discussion among parents and teachers was focused on STEM fields also informs us about the perceived importance of STEM fields in current society. In Spain, STEM professions tend to be associated with much greater prestige in terms of salary, academic difficulty and social consideration than other professions (Sáinz et al., 2016).

Future Directions

With regard to teachers, it is thus essential to identify the major shortcomings in primary and secondary teacher training and encourage the incorporation of gender as a prerequisite in their curricula in order to achieve inclusive, plural, and diverse models for teaching practices. Teacher training programs should analyze the implications of gender inequalities in students' self-perceptions of ability in the official school curriculum, materials, and teacher practices.

The opinion and experiences of technology teachers can inspire the design of measures to neutralize gender differences in self-perception of ability in particular and in school dynamics in general. These experiences can also inform about concrete teacher practices that could be implemented to empower girls' competences not only in STEM but also in other non-STEM subject areas, such as economics. In addition, these teacher practices could also be worth sharing in order to counteract boys' tendency to brag about their STEM abilities. Future research should analyze the long-term effects and implications of these inaccuracies in boys' and girls' career pathways, from primary school through to the transition to work.

Further research involving parents is also required. Since one of the challenges for researchers studying parental socialization seems to rest on the separation of parent-child influences from parent-child influences (Leaper, 2014), studies examining both influences are essential. More interventions involving parents and teachers to promote realistic views of their competences in boys and girls are also required.

In addition, given that research on gender differences in different facets of intellectual achievement has provided the justification for policy decisions such as funding for sex-segregated education (Lindberg et al., 2010; Voyer and Voyer, 2014), future research is still required to define the main factors associated with gender differences in school performance and self-perceptions of ability.

Limitations

Limitations of the present study may be attributed to the lack of use of a non-focused interview guideline. However, the exploratory nature of this research required that parents and secondary teachers expressed their views in an open way. Another limitation of the present research is the underrepresentation of fathers. Future research should incorporate more men and their perspectives on these issues. Engaging more men in these issues is highly requested.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Institutional Review Board of the Universitat Oberta de Catalunya. The ethics committee waived the requirement of written informed consent for participation.

AUTHOR CONTRIBUTIONS

MS conceptualized, designed, and coordinated the realization of the study, wrote the first draft of the manuscript. SF wrote most of the method section and made insightful comments with regard to the justification of the study, whereas JS contributed to the development of the results section. All the authors

contributed to manuscript revision, read, and approved the submitted version.

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Differentiations in Visibility-Male Advantages and Female Disadvantages in Gender-Segregated Programmes

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This article stresses the importance of understanding that women and men in gender-segregated programmes experience their gender minority positions very differently. It stems from an interest in the kind of interventions that academia should address in order to reduce gender segregation and provide women and men with the same educational opportunities and personal development. In relation to the obvious and continuing gender differences along a horizontal dimension, previous research seems to have had a limited impact in breaking gender stereotypes and promoting women and men to more atypical fields. The empirical data consists of 25 semi-structured, individual interviews from underrepresented students' gender-related experiences/thoughts about their programmes. By using the concepts of "visibility," "sense of belonging," and "negotiating otherness" to analyze how negotiation and belonging are part of students' everyday university lives this study's most important contributions are its findings regarding the differentiations in visibility. A continuum of visibility experiences is explored, from men who receive positive attention to women who are being considered as less knowledgeable. Our visibility scale indicates, as does previous research, that there are differences between how female and male students become visible, but the differences can also appear within both groups of students. This knowledge is crucial when designing interventions so as to provide positive study environments for both women and men. Also—in a broader perspective—it is important in order to recruit and ensure that gender minority students remain in the programs.

Keywords: gender segregation, gender minority, higher education, experiences, visibility, sense of belonging, negotiating otherness

INTRODUCTION

The main objective of Sweden's gender equality policy is that women and men shall have the same possibility to shape the society and their own lives. Further, the government has six sub-goals to achieve gender equality. One is "equal education." The government states that women and men, girls and boys should have the same opportunities and conditions with regard to education, study

options, and personal development (www.regeringen.se). But gender differences persist along a horizontal dimension. Decades of research and evaluations have documented that despite policies and efforts to lessen gender segregation in Swedish higher education, women, and men continue to enroll in different study programmes and subjects, based on their gender. Women still dominate in health care, elementary education and domestic spheres (HEED), while men dominate in science, technology, engineering and mathematics (STEM) (UKÄ (Swedish Higher Education Authority), 2016).

This study stems from an interest in the kind of interventions that academia should address in order to reduce gender segregation and to meet the equal education sub-goal that is given by the government, as well as provide women and men with the same educational opportunities and personal development. Given long-existing patterns, higher education institutions have not been able to break the history of gender stereotyping and the fact is that women and men continue to choose subjects according to traditional gender roles. Thus, policy makers, teachers and parents must tackle gender stereotypes early on. However, universities can affect how students experience and perceive their study and learning environment from a gender equality perspective; also, they can encourage students to choose programmes other than those that typically have been selected due to gender stereotypes. In fact, Swedish universities are, according to the Swedish Discrimination Act, required to take active measures to prevent discrimination and ensure that the study environment (physical, psychological, and social circumstances) is safe, equal, inclusive, and facilitates the studies.

Previous research (e.g., Steele et al., 2002; Honghong et al., 2011; Fouad et al., 2016; Heikkilä, 2016) has focused on how women and men in gender segregated programmes experience their study environment. However, in relation to the obvious and continuing gender differences along a horizontal dimension, this research seems to have had a limited impact in breaking gender stereotypes and promoting women and men to more atypical fields. Thus, this article will study how gender minority groups in highly gender-segregated programmes experience their study environment; and, the aim is to suggest the measures and interventions higher education institutions should address to provide equal study and learning environments to lessen gender segregation and create change. The research questions that are explored are the following:

How do women and men in gender-segregated, higher-education programmes experience their studies and study environment?

The study examines underrepresented students' gender-related experiences in four vocational programmes at a university in Sweden: nursing programme (12% of the students were men), pre-school teacher programme (5% of the students were men), construction engineering programme (29% of the students were women), and computer science and engineering programme (15% of the students were women). When we write about "gender minority groups," we refer to numeric minority, i.e., women studying in male-dominated STEM-fields and men studying in female-dominated HEED-fields.

PREVIOUS RESEARCH

Educational Experiences for Gender Minority Students

Ecklund et al. (2012) argue that gender represents a more important reason for choosing a field of study than the area itself. They claim that interest is not the primary reason for one's choice, but rather is related to gender norms. Snyder and Green (2008) show that men working in nursing are drawn to areas that are considered more masculine, such as emergency care and anesthetics. Tellhed et al. (2017) found that beliefs about one's capabilities and social expectations (where people fit in socially) affect gender differences in the various sub-specialties.

Gender differences in STEM fields relate strongly to women's low self-confidence in these areas and to a lesser degree the question of social belonging. For male students, the issue of social belonging partly explained their reduced interest in HEED studies, while self-confidence did not factor in as a reason for not choosing to major in these fields (Tellhed et al., 2017). The men in HEED-professions were given more promotional advantages, though also expected to do traditionally masculine duties such as heavy lifting (Williams, 1992).

Other studies demonstrate how women's educational experiences are affected by gender: Several have noted the problems and obstacles they encounter in engineering programmes (e.g., Powell et al., 2009; Morganson et al., 2010; Singh et al., 2013; Fouad et al., 2016). Further, it has been argued that women doubt their abilities to a greater extent than men in male-dominated educational fields, although no differences in performance have been demonstrated. The limited research on men in gender minority fields shows they do not doubt their capacities to the same extent (Cheryan and Plaut, 2010).

Cech et al. (2011) examine how women in male-dominated subjects tend to lack professional role confidence because they lack external encouragement. Professional confidence can be understood as an individual's confidence in his/her ability to successfully complete tasks, and develop a positive identity in a profession. Male students usually get such encouragement readily, but women feel they must search for it. Moreover, the lack of confidence reduces their likelihood of staying within these professions. Thus, women studying engineering need to be included on equal terms and also encouraged in the same ways as the male students.

A study by Steele et al. (2002) found that women who study in male-dominated fields in the U.S. experience more difficulties (due to their gender) than men. Women experienced gender-threats and discrimination and considered leaving their programmes. Conversely, men who were in the minority said they did not experience threats to the extent that women did.

Despite years of research aimed at understanding why women are underrepresented in STEM fields, fewer efforts have been made to understand why men are underrepresented in HEED fields (Block, 2015). There is also a lack of research on and attention to men's experiences in gender minority positions in HEED programs—with some notable exceptions. For example, Buthelezi et al. (2015) describe the learning experiences of

male nursing students. Referring to previous studies (Levett-Jones et al., 2008; Mabuda et al., 2008; Pitkääjärvi et al., 2012), they say there seem to be fewer differences between male and female experiences as nursing students; however, Buthelezi et al. (2015) demonstrate how male nursing students experience more challenges than the females in clinical settings, which significantly affect their self-esteem. The authors suggest that male students should be provided with more support during their training, to help them build confidence.

Keogh and O'Lynn (2007) explore the consequences of non-supportive learning environments. In their study, they describe how faculty and staff nurses tend to be negative toward male students, which can cause them stress. Honghong et al. (2011) describe how male nursing students experience loneliness and psychological stress. This is also noted by Stott (2007) who found that male nursing students felt isolated. In addition, Kleinman (2004), Li and Ren (2007), and Stott (2007) found that male students, as a minority in nursing programmes, avoid interacting with their female classmates, fearing they will be regarded as feminine.

Heikkilä (2016) shows similar patterns regarding males in pre-school teacher programmes. She found that male students do not want to be identified as *male* preschool teachers, but as preschool teachers, without the prefix "male." These concerns did not affect their self-confidence, since they were warmly welcomed in the schools. However, male students at pre-school programmes tend to drop out to a greater extent than women (UKÄ (Swedish Higher Education Authority), 2016). A number of studies have concluded that the risk of being accused of child sexual abuse causes anxiety and stress among male students (Nordberg, 2005; Heikkilä, 2016).

To summarize, students who study subjects and are enrolled in programmes that are atypical for their gender encounter various obstacles such as isolation and discrimination and suffer from stress. In previous research, it has been suggested that these obstacles could be reduced by supporting the gender minority students through social activities and programmes and/or to promote self-esteem. However, few studies compare different experiences and programmes in the same study which means that this study has important contributions to make.

Theoretical Framework

Gherardi and Poggio (2001) speak about organizations that are "doing gender" in a way that is applied in this study. This is a way to understand the role of gender in organizations such as universities, as a continuous process that affects the participants. Gherardi and Poggio (2001, p. 248) describe it in the following way:

"By saying that also organizations 'do gender' we mean that organizational cultures contain specific rules, values, meanings expressed in social situations in which gender-positioning processes are realized as interpersonal relations in a public process whereby gender meanings are progressively and dynamically achieved, transformed, and institutionalized. It should be emphasized that gender is not located solely at the level of interactional and institutional behavior (the gender we do); it also lies at the level of symbolic structures (the gender we think)."

This approach can be linked with a perspective of how learning is a central activity for universities and how "doing learning" constantly needs to be understood in relation to "doing gender," or perhaps more widely "doing identity." Identity work in these contexts can be seen as "a set of active processes (such as forming, strengthening and revising) which serves to construct a sense of identity" (Beech, 2008, p. 51), which consists of activities and negotiations that are constantly carried out in social contexts.

Nentwich (2006) suggest a typology of doing gender, where it is divided into five aspects of empirical "evidence." In this study, Nentwich and Kelan's concepts are not applied but they form a clear focus of how to empirically study "doing gender." They consider the concepts of negotiation and belonging, which, to Nentwich and Kelan, could be a mix of doing gender through structures and identity work. The concept "sense of belonging" (c.f. Hattie, 2009) is a way of capturing the aspects of learning in the empirical data together with "negotiating otherness" (Sumsion, 2000), which can be connected to understanding how gender is being done in a minority position.

This study was conducted at one university where the main aim was for the students to develop knowledge in different subject areas to enable them to practice a specific profession in the future. Learning is the formal focus of why students are at the university, but in order for it to occur, the environment needs to be permissive and inclusive, where students are given a sense of belonging (Hattie, 2009), which can contribute to a basic security that allows them to try and test new and old concepts, reject incorrect information and acquire new information. These are central components of learning processes (Vygotskij, 1978; Säljö, 2000) that need to be present in supportive educational environments, which include lively communication and interactions—which are crucial in "doing learning" contexts (Vygotskij, 1978).

In the process of "doing learning," "doing gender," and "doing identity" power structures are established through the rituals, rules, negotiations, and positionings that occur (Wernersson, 2009; Francis et al., 2012). These can be either constructive or destructive (Selander, 2017). Indeed, the "doings" (the processes) where destructive power is distributed can negatively affect individuals and recreate gendered organizations that exclude and diminish individuals and groups.

Analytical Concepts

The analytical concept adopted in this study enables an understanding of how the learning context is formed of gender relations. Together with processes of doing gender, identity work in terms of negotiating social positions (which result in a sense of belonging) *visibility* can be a fruitful concept to use to understand how these processes are being materialized into social university life. Being visible to one self and others is also a way to create a feeling of belonging to a group or to a social context.

The concept of belonging is closely linked to the overall educational reasoning above. To belong in a social context can be understood as closely related to being and becoming visible and making oneself visible. What can be added is how individuals of one gender can feel a sense of belonging, although they are a distinct minority, depending on how the majority group

receives and includes them in terms of visibility. If there is a strong normative formation of the majority group, it is unlikely that minority individuals feel they belong to it. “Negotiating otherness” (Sumsion, 2000) can be understood as realizing you are in a gender minority position, reminded of this by oneself and others and thus negotiate how to make that difference visible. It is important that both the “sense of belonging” and “otherness” are ongoing negotiations: They are not stable or states that can be determined by others. For example, being a male in a female-dominated programme means negotiating your identity, rights, and obligations in relation to others.

Combining these concepts makes it possible to discuss elements of gender minority positions in the university context: i.e., it raises the question about what it is like to not fit in properly, not belonging to the social norm, and how individuals handle the social structures in which they participate.

Design of Study, Methods of Data Collection and Data Analysis

The purpose of this study is to capture underrepresented students’ (male and female) gender-related meanings, experiences, and thoughts about the content and structure of their programmes, their everyday life as university students and thoughts about being in a gender minority position. Thus, we apply a qualitative approach since it will be able to capture experiences, meanings, and thoughts (c.f. Brinkmann and Kvale, 2018; Cohen et al., 2018).

The empirical data consists of 25 semi-structured, individual interviews from underrepresented students’ experiences and thoughts about their studies and study environment. Each interview followed a specific questionnaire (**Appendix 1**). The interview guide contained themes and questions all of which were asked to each student. However, the interviews were flexible as questions were adapted and changed depending on the students’ answers.

The four vocational university programmes included are (a) nursing programme (b) preschool teacher programme, (c) construction engineering programme, and (d) computer science and engineering programme. Each has a clear gender majority but the pre-school teacher and computer science and engineering programmes are more gender-segregated than the constructions engineering and nursing programmes. Students, who were selected with information from programme managers, were informed about the study from one of the project members by email or telephone.

For ethical reasons, the exact number of interviews from each programme will not be presented since they involve very few gender minority students, who could thus be easily identified (c.f. Berg and Lune, 2012). Women in the civil engineering and computer science programmes were interviewed; men in the nursing and pre-school teacher programmes were interviewed. All together 13 male students and 12 female students were interviewed. The women were 21–28 years of age. The average age among the female students was 24 years. Many of the female students came to the university directly from upper secondary school and had not worked or taken time off from their studies.

The men were 21–42 years. The average age of the male students was 30 years. All interviews were conducted by a research team member. Each interview took between 25 and 60 min, took place at the university in a meeting room, and was transcribed; and, the team used the transcripts to make the analysis—although the audio files were available, if needed.

Analysis Process

The analysis, whose focus was to understand the gendered everyday experiences of those interviewed at the university, involved several steps of coding. It was inspired by the Constructivist Grounded Theory (CGT). In CGT, knowledge is considered socially constructed and developed through joint interpretation (c.f. Charmaz, 2008, 2014).

Our empirical data was analyzed through initial coding, focused coding, and coding of subcategories. Through the analysis, comparisons were made between data, memo writing, and theoretical framework/concepts (c.f. Charmaz, 2014). This could be considered to be a deviation from one of the main principles of grounded theory. Traditionally, grounded theory sets out to construct theory from empirical data. However, in our case, we applied our theoretical framework and analytical concepts while categorizing our empirical data. This demonstrates how grounded theory can be adapted in various ways. Bryant and Charmaz (2007) argue that grounded theory strategies have almost become routine practices in qualitative inquiry. Qualitative researchers adopt aspects and coding strategies from grounded theory for coding and synthesizing data and developing themes. As demonstrated above we have been using some of the elements from CTG, i.e., coding techniques for our data analysis.

RESULTS

Always Gender, Always Visible

Visibility seems to be a crucial factor for most of the gender minority students, something they had to routinely consider. Based on the model developed by Morgan and Davis-Delano (2016) and Chatfield (2018), **Table 1** summarizes our results.

The concept of visibility is divided into four subthemes, which illustrate its differences and consequences. These are labeled *experiencing appreciation* when visible, being neutral to the *visibility*, *experiencing negative attention*, and being *considered less knowledgeable*. These four categories create a polarity where women’s experiences are mostly negative, and men’s experiences are positive. In addition to these categories, a pattern emerges in which students in a highly gender-segregated programme, where the gender minority group is very small, experience greater visibility than those in a programme with less gender segregation. Among the categories there are ongoing negotiations and the categories can be seen as social signs of negotiation. Some students change positions between categories, which can be understood as a way of continually negotiating *otherness* and thereby also negotiating how one’s identity is “allowed to” be displayed.

TABLE 1 | “Visibility” differentiations.

Subthemes of visibility	Description of theme	“Visibility scale”
Experiencing appreciation	Students’ examples of how they were appreciated for choosing a field of study that is atypical for their gender	Only men were in this category, most of whom were nursing students, but some were also pre-school students
Being neutral to the visibility	Students’ examples of how gender does not affect their studies	Only men were in this category; most were pre-school students, but some were nursing students.
Experiencing negative attention	Students’ examples of negative attention related to gender because of their professional choice	Mostly women were in this category; most were constructing engineering students, but some were computer science and engineering students Some male pre-school students note negative attention but not in the study environment itself. They are afraid of being accused as pedophiles when they start working.
Being considered less knowledgeable	Students’ examples of how their knowledge is questioned by other students due to their gender	Only women were in this category, all of whom were in computer science and engineering

Experiencing Appreciation

Being visible includes getting attention and often appreciation, at least for some. This appears as a clear pattern in the interviews with male students. The male students on the pre-school teachers programme and nursing programme indicate that they are getting a very positive response during their internship because they are men. Here is how one male student expresses it;

“Many older people express ‘wow, a man is coming now, a guy is coming to my room now and taking care of me,’ ‘oh come here’ like this. They behave in this way.”

Male nursing student

There are several similar statements in the empirical data, for example;

“So, everyone is really positive that I come to an internship as a male preschool teacher student. Both the parents and the children appreciate it very much.”

Male pre-school teacher student

However, there are male students who express a hope of also being appreciated as just preschool teachers, and not just as *male* preschool teachers.

Visibility can also be an expectation that one is a hero or pioneer, which is a form of appreciation.

“They always look up to you when you come out. So that’s an advantage, I think.”

Male nursing student

In this example the student links visibility to advantage, and this can be interpreted as something he wants to keep.

Women that were interviewed do not express that they encounter this kind of appreciation. They do not experience appreciation of the professional choice they made, although in the societal discourse it is often argued that more women are needed, for example, in the engineering profession. The female

students are capable to reflect upon the fact that more women in the engineering industry are needed, but they do not describe this in the same way as the male students’ experience of their professional choice.

Being Neutral to the Visibility

On the other hand, in some cases, gender does not seem to matter in the male students’ everyday practice and study environment. In the interviews we find students who “don’t care” about being visible or who don’t mention aspects that can be understood as related to visibility. As mentioned above, the preschool students do not want to be considered as *male* preschool teachers. Otherwise, gender does not seem to be something causing negative and/or positive experiences. The preschool students express their experiences of visibility rather neutral. Gender is always present. It is integrated into the subject content, but not an “issue” in the classroom and study environment.

“Of course, it is obvious that you are in a gender minority. But I think it is ok being a male student and a future preschool teacher.”

Male pre-school student

The male nursing students also describe how gender is present most of the time but not really an issue. The visibility is neither negative nor positive. However, one of the nursing students expresses that even if he can not report any negative experiences, he would feel more comfortable if the nursing programme would be less gender-segregated;

“It would be more secure for me to have more guys around and not so many women around me. Even though I communicate better with women than men. But... I cannot really describe the experience, but it would feel better to have more guys.”

Male nursing student

Experiencing Negative Attention

For other students, namely women in gender minority groups, visibility involves a negative experience. In this group the

students do not like being visible; they are worried about what happens if they are too visible and for turning out as not smart despite being visible. It can be understood that, if they are not perceived as smart, they deviate from the expected norms of being women in education. Here are two different female students' voices;

"You do not want to be seen as unknowing because you are expected... yes, it is actually that you are expected to be smart as a woman."

Female construction engineering student

"Once we had a guest lecturer who was there for some time, it was something about electrical engineering, so he explained and drew up a schedule on the board, and he began to talk a little about his wife, arguing she couldn't easily understand the schedule, so he said something like 'yes, it is a little harder for women to understand something like this.' And I just... I said something like just what do you mean there, how can you say that? All the other girls in my class just sat completely silent, they did not seem to care as I did. I got upset, how can you stand there saying that."

Female construction engineering student

It is only women who describe this kind of anxiety, even though men to a certain extent on the preschool teacher programme also express similar worries. However, the material stresses that women dominate regarding experiencing visibility as something negative and as something that causes concern and anxiety.

This concern also extends beyond the university, and includes an imagined future, continuing to be a visible person, even at a future workplace. One of the students expressed concerns about entering the industry she is studying to work at. She worries about how she will fit into a workplace where the majority are men.

Another student expresses the visibility and the vulnerability like this:

"As I said, it was a bit more difficult to blend in at the beginning. So, you would need to be accepted before you could set limits, and just not say "no, I do not like that" or "that joke is not funny" and so on. But, from the beginning it was a little... a little challenging to do that."

Female computer science and engineering student

In this example it is primarily male fellow students who make visibility somewhat negative, and this female student adopted the strategy of accepting how the majority behaved in order to be accepted and included. Slowly she started to re-negotiate that position and find a new way of being herself.

Being Considered Less Knowledgeable

The last theme—considered unknowing—has similarities with experiences of negative attention but also add how visibility is interwoven with vulnerability and harassment. This kind of visibility is expressed by women studying at the most

gender segregated program, Master of Science in Computer Science programme.

"Because, we are so few, many guys assume, I think, that girls do not have the same skills in technology, and then you become a fairly easy victim. Or, suppose we don't know as much as they do."

Female computer science and engineering student

In the interviews women in these group also describe how this require them to perform better. They express how they often try to convince those who ignore them, in order to become accepted and perhaps achieve a sense of belonging in the context. Additionally, many of them, to some extent, take responsibility for their feelings at the same time recognizing that the context and the fellow students who makes them feel unknowing is wrong.

"One example was when I sat and studied alone, and a male student came and started looking at my notebook, just pointing, just saying 'you're wrong. And he does not know what assignments I do, he does not know where I am in the course syllabus, he just says I'm wrong. And I knew I was not. And then he came back a while later and just 'no, you were not wrong.' So, it feels like some, yes, just want to point out that I cannot be right."

Female computer science and engineering student

The example tells us there are male students who seem not to be able to accept that women students can have solutions and knowledge of the subject they study. The interviews show that it is usually just male fellow students who question women's knowledge, no other female students or teachers.

However, there are some exceptions when teachers participate in the questioning.

RESPONDENT: ...If I've worked on an assignment with a guy, I've been asked whether I've really done parts of the task. I have experienced that several times.

INTERVIEWER: Did you experience that several times? By who then?

RESPONDENT: By the teacher, who was the examining teacher. He's walking around and checking whether you've been working in the laboratory.

INTERVIEWER: In what way, can you express, how did you know, how did you perceive the signals?

RESPONDENT: They have questioned me and if I have done the work, insinuating I have not participated.

INTERVIEWER: And this when you actually have been participating in the same way as the others?

RESPONDENT: Yes, there have even been times when I've done everything.

INTERVIEWER: You have done *everything*?

RESPONDENT: Yes.

INTERVIEWER: Mm. How did that feel? It looks as if you're concerned about it (the respondent starts crying).

RESPONDENT: Yes.

INTERVIEWER: That it had a bad effect on you?

RESPONDENT: Yes.

Female computer science and engineering student

In the expressed situation, the teacher can be said to contribute to that a student can be considered “unknowing.” There are also examples in the empirical data when teachers argue that gender equality will never be achieved and have supported male students in such discussions. The female student is then forced into negotiating her otherness, and her “un-belonging” when the teacher is claiming that she has not been participating. She has to find a strategy for how to convince the teacher that she in fact has participated.

DISCUSSION

Being in a gender minority position means always being visible in some sense. The “visibility scale” presents how women are more likely to express negative experiences of visibility compared to men who express visibility as something mainly positive and/or report experiences that could be described as neutral. In previous research (e.g., Tellhed et al., 2017) it has been demonstrated how women’s lower self-efficacy for STEM careers is an important mediator for them not choosing STEM majors. As for male students, social belongingness expectations explain their lower interest in HEED studies. While women doubt their competence in male-dominated fields (Cech et al., 2011; Tellhed et al., 2017) men do not seem to be concerned about their competence, skills, and future performance in female-dominated areas (Cheryan and Plaut, 2010). Rather, their concerns are about the social aspects of the study environment. The analysis of our empirical data suggests that these concerns are “logical” in relation to the study environment women and men seem to enter when they choose an atypical education program. In accordance with previous research (e.g., Steele et al., 2002; Powell et al., 2009; Morganson et al., 2010; Singh et al., 2013; Fouad et al., 2016) women in STEM educations encounter several obstacles. For example, their competence is questioned, and they experience discrimination, gender-based and stereotypical threats. In this study, these kinds of experiences are reported as well. However, our “visibility scale” suggests that women have different experiences of being visible in the two different education programmes. Female computer science and engineering students experience to a greater extent than construction engineering students: *harassment* and *vulnerability*. They are considered as more unknowing than the construction engineering students as well. At the same time, female students on male-dominated programmes also share a lot of experiences, as the result show. They do not express a total lack or support or positive reception for their career choice, but they have said they are repeatedly questioned and exposed in several different ways.

To use the concept of “sense of belonging,” it can be said that women rarely express a positive sense of belonging in relation to their studies. The most vulnerable students are the students of computer science engineering, where the interviews show a skewing of power distribution in the education practice. The male students, to some extent also male teachers, have the power over how communication positions are created. The women see themselves as being disadvantaged, expressing they must relate to the male students. They do not experience equality between women and men in their everyday practice. This

problem is visible, to a certain extent, also amongst women on the construction engineering programme, but to a lesser degree. Women can also be said to have to negotiate their gender more frequently presenting themselves as a kind of neutral person, where gender does not exist, even though it is present all the time.

The differences among the female students could be interpreted as a result of which programme they belong to. The construction engineering programme is less gender-divided than the computer science and engineering programme. This is probably why the women in computer science are in a more vulnerable position. However, differences in numbers do not seem to be able to explain why the male nursing and pre-school students tend to experience visibility in different ways. These education programmes are almost equal when it comes to gender distribution. Our analysis demonstrates that the male students’ experiences of being visible are mainly positive. They do not seem to experience the challenges reported in previous research such as lower self-esteem, non-supporting learning environments and isolation (e.g., Kleinman, 2004; Keogh and O’Lynn, 2007; Stott, 2007; Honghong et al., 2011; Heikkilä, 2016). However, the empirical data, summarized in the “visibility scale,” indicates that there are small but significant differences. The nursing students are more represented by the theme *experience appreciation* while more preschool students are found in the theme *being neutral to the visibility*. Male students on programmes where women are in the majority, are often faced with positive comments and inclusion in a future professional community. Male nursing students almost acquire a kind of hero status. According to our interviews, they receive great support and encouragement, which gives confidence. Among male students, there is no doubt about whether they have made the right study choices, compared to a greater hesitation around that decision among some women. Accordingly, they do not question whether they will do a great job, rather the opposite. These students take away a high degree of sense of belonging from the programme. Nevertheless, there are also contradictory experiences of being singled out, for example, among male pre-school teacher students, which means that they need to negotiate otherness, being in a minority position as a male student. The male nursing students seem to experience this to a lesser extent, but there is also the possibility of choosing this part of the profession that supports a certain type of masculinity associated with risk and safety (ambulance nurse, emergency nurse), still connected to a certain kind of masculinity.

CONCLUSIONS

This article stresses the importance of understanding that women and men in gender-segregated programmes experience their gender minority positions very differently. How gender is present differs significantly in different programmes. Using the concepts of “visibility,” “sense of belonging,” and “negotiating otherness” has made it possible to document how negotiation and belonging are part of students’ everyday university lives, as is described by Sargent (2005) and others. The concepts were used to understand the effects of being repeatedly reminded of or being perceived as “different” in educational settings.

The following question was asked in this study:

How do women and men in gender-segregated, higher-education programmes experience their studies and study environment?

The study's most important contribution is its findings regarding the *differentiations in visibility*. A continuum of visibility experiences is explored, from men who receive positive attention to women who are being considered less knowledgeable and experience a study environment that is far from non-discriminatory and supportive. Our visibility scale indicates, as does previous research, that there are differences between how female and male students become visible, but *the differences can also appear within both groups of students*. This knowledge is crucial when designing interventions so as to provide positive study environments for both women and men (c.f. Kalev et al., 2006). The results suggest that universities should have different intervention strategies in their various programs (e.g., nursing, pre-school, construction engineering and computer science and engineering programmes) since the students' visibility experiences differ. The visibility scale could be used as a tool and starting point to identify expressions and differentiations in visibility experiences. In doing so, suitable interventions could be designed to provide non-discriminatory and supportive study environments for all students.

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DATA AVAILABILITY STATEMENT

The datasets presented in this article are not readily available because consent was not obtained from the participants to share the transcripts of the interviews. Requests regarding the datasets should be directed to the corresponding author.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

All authors listed have made a substantial, direct and intellectual contribution to the work, and approved it for publication.

SUPPLEMENTARY MATERIAL

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/fsoc.2020.563204/full#supplementary-material>

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Classical Sociology Through the Lens of Gendered Experiences

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There is a body of literature problematizing *the lack of* women's accounts in what is called classical sociology. However, limited efforts have been made to place female and male theorists' writings in juxtaposition with each other in order to demonstrate how their writings and theories differ. The aim of this article is to encourage discussion of how early female and male sociological theorists' descriptions and interpretations on the development of modern society were shaped by their own gendered experiences. Further, the aim is to shed light on the consequences this might provide for the teaching and learning of classical sociology. The article contributes a comparative analysis on how five authors, three female and two male, described and interpreted the transition from traditional to modern society through their gendered experiences. Their various interpretations illustrate how experiences are situated and that there is no complete and objective knowledge. As a consequence, universities should pay careful attention to gender distribution in their syllabi. Rather than achieve equal numbers of female and male authors, this will ensure that students are able to explore and understand classical sociology through the lens of different gendered experiences during their studies.

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INTRODUCTION AND BACKGROUND

In prologs and back-cover blurbs for classical literature in sociology, Karl Marx, Emile Durkheim, and Max Weber are described as “pioneers,” “trailblazers,” and as the most significant social thinkers for understanding social life and societal development (e.g., Giddens, 1973; Morrison, 1995; Hughes et al., 2003; Calhoun et al., 2012). In several respects, these male classical scholars were pioneers in their fields. However, these men were not alone. Women were also major players in the development of sociological thinking and social theory. This was despite their work being largely invisible or “written out” of history as some authors suggest (Lengermann and Niebrugge-Brantley, 1998). Consequently, for several decades, it has been argued that higher education students are presented with sociology content based on only male voices. Approaching only a masculine view of classical sociological theories and concepts – that are presented as non-gender specific and universal – affects the conceptions of sociology as a science that students acquire (Stanley and Wise, 1993; Magdalenic, 2004, 2015). One way to address these issues is to incorporate the writings of female scholars into all syllabi in classical theory and thereby solving the “problem.” An equal representation of female and male authors could result in a more nuanced picture of the social world during the growth of modernity and issues such as politics, labor, and economics (c.f., Thomas and Kukulian, 2004). However, adjusting the syllabi to achieve gender balance, does not necessarily make students aware of how female and male scholars speak from their own situated experience and standpoint (c.f., Smith, 1987, 1999, 2005).

There is a body of literature problematizing *the lack of* women's accounts in classical sociology. Limited efforts have been made over time to place female and male theorists' writings in juxtaposition with each other to demonstrate how their writings and theories, due to their different experiences, differ from each other. However, some important contributions have been made in this field. Lengermann and Niebrugge-Brantley (1998) presented 15 women sociologists of the 19th and early 20th centuries. They described each woman's contribution to sociology and also some differences among these female sociologists and male sociologists concerning *their choice of aspects to be observed*. In their study, Grant et al. (2002) explored sociological writings by women and men between 1895 and 1940. They argued that women's work was different to that of men. More women than men wrote empirical, evidence-based articles. Further, women wrote about women, children, immigrants and the poor – subjects that tended to be rather absent in the men's work. Although contributions like these are valuable, this article argues that it is also important to provide university teachers and students with literature and articles that do not “only” describe differences in *what subjects* early female and male sociologists explored. More articles are needed that demonstrate how female as well as male sociological theorists interpreted the development of modern society *and the same subjects* very differently. Therefore, the aim of this article is to encourage discussion of how early female and male sociological theorists' interpretations of the development of modern society have been shaped by their own gendered experiences. Further, the aim is to shed light on what consequences this provides for teaching and learning classical sociology. Through a comparative analysis of five authors, three female and two male, this article documents how the authors describe and interpret some social processes and phenomena. Hence, the research questions that are explored are: How do these female and male scholars describe the transition from traditional to modern society through their lenses of gendered experiences? How did this societal development, according to these scholars, (re)shape gender and gender relationships?

The two questions reflect an interest in capturing how female and male theoreticians reflect on gender (or not) in their accounts of the development of modernity. Also, what happens to the teaching and educational content in classical sociology when both women and men “are permitted” to pursue it. As such, this article also engages in the wider debate of how to teach sociology and particularly *why* and *what* we should teach in sociology today (c.f., Harley and Natalier, 2013).

THE SELECTION OF THEMES AND AUTHORS

The writings of five authors (three women and two men) have been placed in juxtaposition with each other to demonstrate how early female and male sociological theorists' interpretations and further descriptions on the development of modern society are shaped by their own gendered experiences. Texts written by Charlotte Perkins Gilman, Jane Addams, and Marianne

Weber are presented and discussed in relation to selected sections of Max Weber's and Emile Durkheim's collective works. The selection of authors has been guided by the selection of themes. To capture different views of modernity's growth, a set of historical processes that brought the end of traditional society and replaced it with new forms of social orders were first identified. Societal changes in relation to religious beliefs, economic capitalism, urbanization, the division of labor, and new forms of social organizations are some processes that transformed the traditional order (Alexander et al., 2016). In this article, these processes were chosen and then highlighted through the writings of Charlotte Perkins Gilman, Jane Addams, Marianne Weber, Max Weber, and Emile Durkheim. Several classical scholars, female as well as male, have written about these subjects and phenomena. However, these five theoreticians were chosen because they were somewhat contemporary with each other. Since their interpretations clearly differ, it can be argued that the juxtaposition can serve as a pedagogical tool to demonstrate how gendered experiences matter.

This article is organized as follows. In the first section, *The protestant ethic and the spirit of patriarchy*, the relationship between religious values and the rise of modern capitalism is explored from female and male scholars' perspectives. In the following section, *Men and society*, the female and male scholars' writings about social activities point to diverse understandings of the purposes and outcomes of social organization for women and men in modern society. The next section, *The elementary forms of the isolated life*, describes how female and male scholars interpreted the growth of modernity, and phenomena such as differentiation, specialization, and the division of labor, very differently. Finally, the last section concludes the article with some final remarks in relation to the aim and research questions.

THE PROTESTANT ETHIC AND THE SPIRIT OF PATRIARCHY

The relationship between religious values and the emergence of the spirit of modern capitalism is well-explored in the writings of Max Weber and Marianne Weber. In this section, it is demonstrated how they interpreted the consequences of this development in various ways. While Max Weber acknowledged religion as a catalyst for rationality and modern capitalism, Marianne Weber recognized how the protestant ethic and modern capitalism reinforced patriarchy.

Religion as a Catalyst for Rationality and Modern Capitalism

In his well-known study of religion, *The Protestant ethic and spirit of capitalism*, Max Weber demonstrates how the ethics of ascetic Protestantism played a crucial role in the development of modern society and capitalism. According to Max Weber, the Protestant ethic concerned the religious cornerstones that primarily influenced Calvin's profession of faith. The core of this profession of faith (the doctrine of predestination) was that God had decided that some people were predestined for life everlasting and others for everlasting death. For believers, this

profession of faith caused constant worry. Who was chosen? In striving to ensure one's own salvation, believers tried to find signs from God. Hard work and self-discipline should contribute to a successful life, which in turn could be a sign from God that one was chosen (Weber, 1904-5/2007:233ff). The rational way of life on the basis of the idea of a calling was accordingly an important driver of capitalism. The spirit of modern capitalism should therefore, according to Weber, be understood as a part of the development of rationalism as a whole. However, Weber was very doubtful about the rationalization of the world. For him, cold calculation would push away value aspects and make the world boring. The only area, which to some extent was freed from the so-called iron cage of rationality, was love and sexual passions (Weber, 1949).

What distinguishes Weber's analysis of the Protestant ethic and spirit of capitalism, in relation to societal development and the growth of modernity, is a gender-neutral terminology. However, it could be argued that gender very much permeates Weber's thinking and observations. In *The Protestant Ethic and the Spirit of Capitalism*, Weber implicitly demonstrates that the masculinity that was favored in western capitalism was related to participation in the public sphere in collaboration with other men. This is a masculinity that builds on homosocial competition (c.f., Connell, 2005). Weber emphasizes how important it was for a *man* to belong to a church or association where ethics and morals were asserted as important aspects to succeed in one's career. For example, Weber presents the story of a businessman who wanted to open a bank. The first thing the businessman did was to seek admission to the Baptist movement. If the man was accepted into the congregation, it was seen as an absolute guarantee for a gentleman's ethical and moral qualities. The chances of succeeding as a businessman were markedly affected if one was recognized and legitimized by other men (Weber, 1904-5/2007).

Weber considers God's confirmation as hardly sufficient to improve the modern capitalist business ethos that was growing forth. Men's confirmation of each other, practiced through qualifying examinations in the voluntary societies/associations, was probably just as important as the idea of a calling in the establishment of the rational way of life. In other words, with the growing rationality and modernity, homosocial masculinity grows forth, something that Weber actually describes, but keeps from making into a question about gender relationships.

Religion as a Catalyst for Women's Subordination

Max Weber provides an understanding of religion and implicitly homosocial masculinity as a catalyst for social action in the development of modern capitalism. Marianne Weber (1912/2003) describes religion as a catalyst for social action of a different nature. According to her, the Protestant ethic had a crucial influence over marriage as an institution. Religion sanctioned women's subordination, among other things, through reference to the Fall of Man:

New arguments in the Bible were sought for the subordination of the woman. Thus, Luther cites Eve's Fall from Grace very

emphatically as a historical source: "If Eve hadn't sinned, she would have reigned together with Adam and ruled as his helper." But now the Regime belongs to him alone, and she must bow before him as before her master (Weber, 1912/2003:88).

Women's subordination was also formulated as an expression for the wish of God. In addition, Marianne Weber demonstrates how Puritanism reinforced the idea of monogamy and encouraged men and women to strive for moral perfection. Marital sensuality was solely a means for reproduction in God's honor.

But, on the other hand, the spirit of Protestantism also contributed to the deepening of the marital ideal, and the shaping of everyday marital life. Namely, through those currents outside of the official churches of the Reformation that are classified as Puritan. Of course, Puritanism made a detour that is not easily recognizable. It, namely, carried into the world and into the institution of marriage with inexorable strictness the ascetic ideals of monasticism: rejection of all life pleasures and suppression of sensuality. Luther's God had still, just like the Catholic God, in magnanimous generosity turned a blind eye toward marital sensuality. The God of the Puritans allowed marital sensuality only for the purpose of the procreation of children for the greater glory of God (Weber, 1912/2003:88).

So, in parallel with the growth of industrialization, Marianne Weber (Weber, 1912/2003:96) argues that Puritanism transformed sexual activities to religiously meaningful and highly disciplined tasks. According to Marianne Weber, modernity began as a positive process. Before industrialization, women's relationships were limited to family and kinship relationships. Women's identity and awareness were especially oriented toward the best interests of the man and the children. With modernity, however, potential forces were born that could break women's limited interactions and isolation in the home. New institutions produced ideals that could contribute to intellectual emancipation among women and challenge the nature of marriage. However, according to Marianne Weber, when religion and capital joined forces in common maxims, these ideas were manipulated in the interest of the patriarchy. With the industrial format that grew forth, capital gained from women's subordination and continued (unpaid) work in the private sphere (Weber, 1912/2003:101).

In sum, Marianne Weber's social analysis illustrates that the Protestant ethic not only contributed to growing rationality in the sense of industrious and hard work in the spirit of capitalism. The marital ideal was also rationalized in the interest of capital. What Max Weber views as the rational iron cage's final bastion – love and marriage – is described by Marianne Weber as perhaps the most rational from a capitalist perspective. Marianne Weber introduces gender asymmetrical perspectives and makes women and the private sphere visible in a way that Max Weber does not. Even if women are not particularly present in Max Weber's ideal-typical discussion about the Protestant ethic and the spirit of capitalism, it could be argued that gender is implicitly present. Max Weber describes how masculine affirmation strategies and homosocial masculinity positions grow forth with modernity.

However, the ideals of masculinity and its consequences from a gender perspective are rather absent in Max Weber's analysis.

MEN AND SOCIETY

With modernity, modern capitalism was born. Charlotte Perkins Gilman as well as Max Weber write about how important it was for men to become members in social clubs and to have social relationships with other men in order to succeed as businessmen. This section shows how they interpreted the consequences of men's different ways of organizing themselves very differently. It also sheds light on how Max Weber's analysis does not take women's organization into account and how men's way of organizing themselves had negative consequences for women.

Social Organization as a Key Factor for Male Power and Female Subordination

The previous section demonstrated how Max Weber emphasizes the importance for a *man* to belong to a church or association. If a man was recognized and legitimized by other men, the chances of succeeding as a businessman increased. However, in the first volume of *Economy and Society*, Weber argues it is not only religious actions and beliefs that matter. Membership in a friendship society, a society for veterans of war and even a bowling club can be of utmost importance. It gives the man relationships that are beneficial far beyond the purpose of the association. Thus, the connections between finances and group activity were accordingly very much a rational connection. As Weber expresses it, membership in a group gave social prestige and financial benefit even if the interests the organization safeguarded were insignificant to the individual member. Men's ways of socially organizing themselves had a profound and positive (and even necessary) impact on their financial activities (Weber, 2019, see also Weber, 1914/2007).

Charlotte Perkins Gilman makes a different description and interpretation of the development of social clubs. In her book, *The Man-Made World*, Gilman points out the negative consequences that the ideal of masculinity and the male hegemony have for women, as well as prosperity and humanity as a whole. Put simply, when theorizing on a number of social phenomena and institutions such as economics, industry, politics, crime, education, sports, religion, literature, art, family, and health, Gilman Perkins (1914/2001:201) states that masculinity distorts humanity.

According to Gilman, women's isolated positions constrained their possibilities to organize themselves. When they organized themselves, they had entirely different issues than men to address on their agenda. In the so-called "women's clubs," which began to form in modern society, participation was often motivated by the idea that women would "improve their minds." Gradually, the clubs developed, and women began writing extensive reports on social affairs. What often characterized the clubs was that they strived to improve something – such as access to libraries, legal rights, or disadvantaged areas of poverty. Men did not need to do this in their clubs; the club activities

could primarily serve as entertainment and relaxation. In the formal social channels and the institutions, men could carry out and achieve what they wanted (Gilman Perkins, 1914/2001:202). The men's clubs could also contribute to strengthening a man's legitimacy and credibility, which in turn were important for also implementing the social changes or economic activities a man intended to conduct. Put differently, the activities that concerned male contentment were also a part of the development of the homosocial ties that made it possible for men to carry out the financial projects and social changes they wanted to make. Women had to provide input from the sidelines, and their possibilities of influencing economics and society were limited.

In *Women and Economics*, Gilman also describes financial relationships in society and men's different ways of organizing themselves and acting collectively. As bachelors, men build up relationships that are built on friendship and equality. These relationships indeed change when men get married – they become more dependent on securing their income to secure their family's finances and living standard. Even when married men tend to become rivals, financial interests "force" them to organize themselves and build up relationships based on reciprocity. However, women become rivals for each other more through their isolated and antagonistic financial interests. They must always ensure that they have a man who can support them to ensure their own security. This leads to women in their "competition" not having anything to earn from organizing themselves and building up relationships corresponding to the men's (Gilman Perkins, 1898/2006:54-55).

In summary, Charlotte Perkins Gilman and Max Weber describe how different kinds of social clubs and organizations had an important impact over men's financial activities and the development of modern capitalism. However, in contrast to Gilman, Max Weber does not consider the negative consequences of this development for women. With modernity, the connection between women and isolation in the private sphere became as strong as the connection between men and society. With modernity, capitalism was born. This was a type of capitalism that had a cornerstone in financial and (homo)social power principles. Even though women organized themselves, the purposes and outcomes were different. Women organized themselves in order to achieve equal human rights rather than to earn money (c.f., Gilman Perkins, 1898/2006:25).

THE ELEMENTARY FORMS OF THE ISOLATED LIFE

The transition from traditional society to modern society was characterized by the division of labor and differentiation. In this section, it is demonstrated how Charlotte Perkins Gilman and Jane Addams describe this historical process as something that shaped social spaces for men and social isolation for women. While Gilman and Addams identify dramatic consequences for individual women as well as for the entire development of society, Durkheim regards this process as natural. According to him, women by nature did not have especially strong social needs and could withstand isolation significantly better than men.

The Division of Labor – Social Spaces for Men and Social Isolation for Women

As mentioned in the section “The protestant ethic and the spirit of patriarchy,” Marianne Weber was interested in the consequences of modernity on marriage as an institution. In the article *How Home Conditions React Upon Family*, Charlotte Perkins Gilman also demonstrates how marriage developed into a financial relationship when the husband realized what value the woman’s unpaid work in the home had (Gilman Perkins, 1909:593). In her text *The Yellow Wallpaper*, she describes in novel form how the home becomes a women’s prison and how being closed in could drive under-stimulated women to illness. However, even if it was social isolation that caused illness, women were considered, by psychologists, as having weak nerves by nature and thereby more easily develop hysteria (Gilman Perkins, 1997/1892). Gilman discusses how women’s isolation in the private sphere had consequences for the women themselves. What she describes as the arrested womanhood did not tend to develop the best individuals. The isolated conditions and the limitations for women did not promote social progress as well (Gilman Perkins, 1997/1892). The foremost task for sociology must therefore, according to Gilman, be to see which structural changes are required to change marriage as an institution. The social orders that make the woman a property and a servant of the man must be counteracted. Breaking women’s isolation would lead to more intellectual stimulation for women, which in turn would provide benefits in both the public and private sphere (Gilman Perkins, 1909).

In accordance with Gilman, Jane Addams describes how the growth of modernity through differentiation, specialization, and the division of labor resulted in greater participation for men in the public sphere, and isolation for women. Addams refers to women being isolated in one’s own home. Paid work for women largely comprised of services that related to household work. According to Addams, what characterized this industry was that the employed women also lived with their employers. Addams considers this to be extremely problematic and she asked the question of why women, who prepared food and cleaned in another household, should not live somewhere else? Why should these women, like factory workers, not be able to come to their work in the morning and leave it in the evening? (Addams, 1896:538). Naturally, it had to do with the often merciless working conditions, with long working days and heavy household work, that the women were forced to accept. As demonstrated in the quote below, it was also related to notions that this industry could “take care” of the girls/women who did not have the capacity to contribute to what was considered to be the truly progressive industries in modern society.

She is belated in a class composed of the unprogressive elements of the community, and which is recruited constantly from the victims of misfortune and incompetence, by girls who are learning the language, girls who are timid and slow, or girls who look at life solely from the savings bank point of view (Addams, 1896:540).

The employers in this industry treated their workforce as servants in contrast to the other industries of modernity, where

employers and employees were at such different hierarchical positions, without the employee being reduced to a servant. The women who worked in the factories could indeed have tough conditions, but in contrast to the maid, this woman participated in social life. The maid therefore ended up in an especially vulnerable and socially isolated position (Addams, 1896:544). As Addams expresses it in *Democracy and Social Ethics*:

She is obliged to live constantly in the same house with her employee, and because of certain equalities in food and shelter she is brought more sharply face to face with the mental and social inequalities (Addams, 1902/1988:44).

Addams did not see any change in sight as long as the maid’s employer did not become aware of her almost non-existent ethical and moral principles (Addams, 1902/1988:49). She demonstrates that it is not only the maid’s conditions that constituted a serious threat to both the private individual and society in general. Addams describes modern society as a society full of corruption. Capitalism has conquered morality. Capital bribes politics and politics bribes capital and money becomes the only motivational force as general morality, which everyone can relate to, becomes increasingly impossible (Addams, 1902/1988:103ff).

It could be argued that Addams’ thoughts on the development of modernity are permeated by descriptions of the growth of homosocial masculinity. Like Max Weber, although more explicitly, she highlights that the masculinity that was favored in western capitalism was based on participation in the public sphere in collaboration with other men. What the alderman in the city demanded was loyalty from his subordinates, men who were good to him, men who stood behind his decisions and actions. Political life consisted of men who wanted to know that they were especially chosen and who were part of the group entrusted with political “gossip.” They wanted to belong to those who understood the nature of things and the order of the world. In their reasoning around this homosocial development, Addams refers to Mill who also believed that the man had a need for social contexts and a desire to make common cause with his “peers.” Paradoxically, the collective corrupt masculinity accordingly became synonymous with good morals. A man of high moral standards would think of himself not as an isolated individual, but as a part of a social organism. For the politically elected representatives, it was only important to convince the voters that (the politicians’ own) individual needs were synonymous with “the best interests of the public” (Addams, 1902/1988:105).

In summary, Charlotte Perkins Gilman and Jane Addams show how society’s differentiation created social spaces for men and social isolation for women. According to them, the division of labor had negative consequences for marriage as an institution.

The Division of Labor and Differentiation – Different but Natural Roles Between the Sexes

In contrast to Charlotte Perkins Gilman and Jane Addams, Emile Durkheim believed that the differentiation had created a functional complementarity between the sexes and a mutual

dependence that according to him was the foundation for the family as an institution (Durkheim, 1893/2007). For Durkheim, it was hardly likely that women would ever be able to perform the same functions as men. Women could play important, but entirely different roles than men in society (Durkheim, 1897/2002). Durkheim describes that women by nature did not have especially strong social needs. He argued that women could withstand isolation and enclosure significantly better than men. In his text *Suicide*, he discusses this in detail. According to Durkheim, pious devotions and some pets to take care of are enough to completely meet the older unmarried woman's needs. The man, however, has a need for other activities. Since his social ego is more complicated and developed, he can maintain mental balance only if he finds new points of attachment beyond himself (Durkheim, 1897/2002). Durkheim thereby solves the problem of women's absence from the public sphere by referring to biology.

The division of labor was, according to Durkheim, necessary for larger society to develop. However, the collective conscience that characterized primitive and traditional society tended to decrease in modern society. In modern society, the degree of the division of labor is high and the collective conscience does not grow forth naturally. In this society, the individual is increasingly left alone. The result is too much freedom and too little morality. In order to sustain solidarity and morality, Durkheim advocates *human brotherhood*. According to Durkheim, this ideal was a guarantor for moral individualism and a strong modern society (Durkheim, 1893/2007).

It is easy to assume that Durkheim associates human brotherhood, collective conscience, and moral individualism primarily with the male gender. Firstly, brotherhood on a lexical level is naturally closer to the notion of it pertaining to relationships between men. Secondly, for Durkheim, women do not have social needs to the same extent as men and as society was not necessary for them for several reasons, Durkheim would probably realize that changes in the collective conscience did not affect women as strongly as they were not subjected to the same social strains as the men. Thirdly, if working life is the sphere of life that became the base for cohesion at the same time that morality was considered to be the most important principle of solidarity, the idea of the collective conscience should have its greatest source of development in working life. Mainly men were found there. Durkheim's ideal of human brotherhood as a positive force for counteracting the destructive consequences of the division of labor could again be interpreted as an encouragement and recognition of the necessity of homosocial masculinity.

In summary, Jane Addams saw clear disadvantages with the development that morality took in modern society. Human brotherhood, which in the spirit of Durkheim becomes a positive social force, is described by Addams in an opposite way. She described an increasingly corrupt male morality that had considerable consequences for the idea of the ethical and democratic society.

Addams and Durkheim differ not only in terms of their views on morality and the possible ways for modern society to handle the division of labor. It is also obvious that Durkheim provides a different description than what Addams and the

other female scholars express above. Durkheim believed that women were somewhat well-suited to handle the isolation that the modern project entailed for them, by referring to the objective circumstances, the needs of the organism and women's less developed social needs. Public life and what happened on the production side were not very relevant for women. The female scholars provide a different picture. Women's isolation in the private sphere not only had dramatic consequences for individual women, but for the entire development of society. Accordingly, we are provided with different interpretations and explanatory models for the same phenomena. On one hand, we have Durkheim's analysis, on the other Addams' and Gilman's that partially harmonize with each other. If we read both women's and men's accounts of the development of modernity, we will have diametrically opposed views of "good morality," the reasons for why women are shut away and the consequences of the elementary forms of isolated life.

DISCUSSION

The aim of this article has been to encourage discussion of how some early female and male sociological theorists' interpretations and further descriptions on the development of modern society are shaped by their own gendered experiences. Further, the aim has been to shed light on the consequences this might provide for the teaching and learning of classical sociology. In the article, a comparative analysis of five authors, three female and two male, has been performed to document how they describe some social processes and phenomena through the lenses of their gendered experiences. The following questions have been explored in the article: How do these female and male scholars describe the transition from traditional society to modern society through their lenses of gendered experiences? How did this societal development, according to these scholars, (re)shape gender and gender relationships?

Divergent Accounts of the Same Phenomena

In the article, it has been clearly demonstrated how the female and male sociological theorists' interpretations and descriptions differ from each other as a consequence of their different standpoints and experiences. For example, in their descriptions of the transition between traditional society to modern society, women were placed in the private sphere and men were placed in the public sphere. However, the female and male scholars provide different descriptions of why this transition occurred and, above all, the consequences of the transition for humans and society. Gender and gender relations are to a great extent present in the female scholars' texts while the male scholars' reflections on gender is quite absent. Further, when gender is present in the male theorists' writings, the female subordination and women's role in society are naturalized and made rather unproblematic with references to capitalism, biology, and/or religion.

It is also obvious that the female and male scholars often highlight different explanatory models, aspects, and

understandings regarding the same phenomena based on the gendered lenses they wear. As demonstrated above, the female and male scholars tend to have divergent accounts of phenomena such as religion, rationality, morality, the division of labor, capitalism, social clubs, and the consequences of modernity for women and men. For example, Marianne Weber's and Max Weber's respective descriptions of the origin and effects of the Protestant ethic and the spirit of capitalism represents one example of how women and men provide different descriptions of the same phenomenon, even though they lived in the same environment.

Max Weber discusses how the Protestant ethic contributed to growing rationality in the sense of industrious and hard work in the spirit of capitalism. Even though Max Weber does not use the term homo-sociality, he describes its development as a necessary factor in order to be given admission to the societies that affirmed a man's religious faith and thereby also his creditworthiness. The Protestant Ethic, resulting in growing rationality and forms of homo-sociality, was necessary for the capitalist development. However, it had consequences for the female subordination. These consequences are not theorized by Max Weber but by Marianne Weber who describes how the marital ideal was rationalized in the interest of capital. She argues that the Protestant ethic had crucial influence over marriage as an institution and religion sanctioned women's subordination. Women were, through religious arguments, obliged to the private sphere which was rational from a capitalist perspective. How homo-sociality strengthened men's positions in society is further developed by Charlotte Perkins Gilman in her reflections on women's and men's clubs. Max Weber, who described social clubs from his male perspective did not see any gender conflicts in relation to men's clubs. Men's clubs were, according to him, a rational way of strengthening a man's legitimacy, credibility, and homosocial ties which made it possible for men to carry out financial activities. However, Charlotte Perkins Gilman argues that men's homosocial ways of organizing themselves made it possible for men to earn money but also to make the social changes they wanted to make. Due to women's isolated positions, they had few possibilities of influencing economics and society.

In accordance with Charlotte Perkins Gilman, Marianne Weber and Jane Addams also wrote about how society's differentiation created social spaces for men and social isolation for women. They all describe how the division of labor had negative consequences for women and for marriage as an institution. When Durkheim advocates for the human brotherhood and describes it as a positive force for the good morality and for counteracting the possible destructive consequences of the division of labor – Jane Addams discusses disadvantages within the growth of the modern morality. Rather, she describes an increasingly corrupt morality that had negative consequences for the development of an ethical and democratic society. In summary, it is apparent that the female and male scholars provide us with different perspectives on the same phenomena and that gender and gender relations are present in different ways in the female and male scholars' texts.

The Importance of Visualizing How Gendered Experiences Matter

It could be well-argued that these different interpretations and descriptions of the same phenomena described above, reflect that no one can have complete and objective knowledge. As Smith (1987; 2005) emphasizes, what one knows is affected by one's experiences and subject position in society. The female and male theorists chosen in this article demonstrate their advancement of theory through their various reflections on modernity. The results of the comparative analysis suggest that their different gendered locations shaped their theories. In other words, their gendered experiences shaped their understandings and the (normative) ways they were present and active in the creation of social theory and sociology. As women and men, they were socially situated in different ways. This made it possible for them to be aware of different things, to look at the world in different ways and to ask different questions.

Designing the content and context of teaching classical sociology based on the perspectives of both female and male scholars and further, contrasting their different descriptions of the transition from traditional society to modern society, should provide students with a broader view of sociology as a science. In addition, such an approach to teaching sociology introduces the significance of gender mechanisms in sociological analysis already in the teaching of classical sociology. This could also be done through an intersectional perspective, i.e., demonstrating how ethnicity, age, (dis)ability, sexual orientation, and class also shape interpretations and writings. In this article only white female and male scholars have been taken into account, which clearly has its limitations. Even though it provides the reader with insights about how gender matters, it also excludes other experiences and standpoints based on other power structures.

The sociology of the classics is often the first sociology content that students meet when they begin their sociology studies. Thus, which experiences and accounts that are presented as important for sociological analysis are of great significance concerning how students will come to view sociology as a science. An educational content of sociology based on various understandings provides students with a significantly multifaceted and nuanced sociology than the classical sociology traditionally taught in university institutions. Most importantly, visualizing different interpretations and descriptions and further, demonstrating and exploring them as expressions and consequences of gendered experiences underlines that all experiences are situated and that there is no complete and objective knowledge. As a consequence, universities should pay careful attention to the gender distribution in their syllabi.

Rather than achieve equal numbers of female and male authors, this will ensure that students are able to explore and understand classical sociology through the lens of different gendered experiences during their studies.

AUTHOR CONTRIBUTIONS

The author confirms being the sole contributor of this work and has approved it for publication.

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Intersections Around Ambivalent Sexism: Internalized Homonegativity, Resistance to Heteronormativity and Other Correlates

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This article explores the connections between the construct of sexism and other sociodemographic and attitudinal variables, such as internalized homonegativity and heteronormative resistances, among psychology students. Both unrefined and inferential analyses were used with a representative sample of 841 psychology students from public universities in Madrid. Results showed higher levels of sexism, internalized homonegativity and low resistances to heteronormativity among groups of men, heterosexuals and conservatives. Interactions were found that showed a higher degree of hostile sexism in: heterosexual people with respect to LGB and heterosexual men with respect to heterosexual women. Also, interactions were found to show a greater degree of heteronormative resistance in: LGB people with respect to heterosexuals and left-wing women with respect to right-wing women. Correlations with sexism varied according to gender identity and sexual orientation. In addition, heteronormative resistances correlated negatively with sexism, while some components of internalized homonegativity correlated positively. Political affiliation was the most frequent predictor of sexism. The results highlight the need for an intersectional approach to understanding the phenomenon of sexism.

Keywords: ambivalent sexism, internalized homonegativity, heteronormative resistances, political conservatism, *ex post facto* study

INTRODUCTION

Almost 25 years after the Association of American Colleges and Universities showed that sexual assault on women on college campuses was related to a hidden decrease in gender equality (ACU, 1978), current data reaffirm that inequality remains an unresolved issue. In 2018, 236 allegations and reports of sexual abuse were presented in Spanish universities (Jara, 2018). However, various studies have indicated that many more female students have experienced abuse, but without reporting it (Blahopoulou et al., 2012; Igareda and Bodelón, 2014; Onetti et al., 2018). For that reason, it is important to examine the beliefs and discourses that articulate this abusive behavior against women and are key to its normalization (Blahopoulou et al., 2012). Moreover, such a study

is required by current law, and a commitment has been made to education and research initiatives at the international level (CEDAW, 2015), the European level (Programa 2020; EU, 2013) and in Spain (Law 14/11; BOE, 2011). All of this is particularly important for certain groups like future psychology graduates in terms of their eventual professional work, as laid out in the Psychology White Paper (ANECA, 2005).

Another sector of the population that has been subject to sexual abuse on campus are lesbians (L), gays (G), bisexuals (B), and trans (T), as shown by national and international studies (Hughes, 2018; Rebollo et al., 2018; Biglia and Cagliero, 2019). The visibility of this abuse is low, as it is estimated that only between 16 and 40% of these cases are reported (Ahmed, 2018; Biglia and Cagliero, 2019). Their incidence is minimized in academic institutions, which scarcely recognize them and keep no detailed record of their prevalence (Ahmed, 2018; Biglia and Cagliero, 2019). The motivating factor for the abuse is a sexual orientation, identity or gender expression contrary to the established normativity (cisgender and heterosexual), and not only among LGBT individuals. This forces the person to engage in so-called “passing” to remove any possible suspicion of sexual or gender dissidence (Bachmann and Gooch, 2018; Garvey et al., 2018).

This type of abuse is related to sexism, since LGBTphobia is based on monitoring that which diverges from the spheres of traditional masculinity and femininity. For example, many LGBT people are insulted or scorned because their features or behaviors are considered improper, extending the sexism reaction to men and women who deviate from traditional norms in some aspect of their identity, gender expression and/or sexuality. In Spanish, the genesis of the term “*marica*” – originally a word formed from the diminutive of the name María and meaning “effeminate,” but now a common derogatory term for a homosexual – lays the groundwork for an initial explanation of the connections between sexism and homonegativity (Díaz, 2014). In fact, the discomfort that heterosexual men feel toward homosexual men is, really, a lack of comfort with the expression of female gender (Parrott et al., 2002). Likewise, the literature confirms an alliance between sexist and LGBT-phobic attitudes (López-Sáez et al., 2020) and the resulting violence (Biglia and Cagliero, 2019). Sexism allows for a hierarchization of privilege, where heterosexual, cisgender men are at the top and everybody else is beneath them (Connell, 2014; Glick et al., 2015).

The existence of negative attitudes toward LGBT people is mediated by many factors, including gender identity, knowledge of and contact with the community, political ideology, age, religiousness and sexism, and it is sexism that appears to be one of the most determinant predictors of the degree of LGBTphobia and, particularly, homophobia (Davies, 2004; Warriner et al., 2013; Scandurra et al., 2017). Furthermore, sexism as a prejudice has a shared evolution with homophobia, becoming increasingly subtle and sophisticated (Quiles et al., 2003). Sexism seems to influence not only perceptions against non-heterosexuals, but also a negative self-concept among heterodissident individuals themselves. Therefore, sexism helps to guarantee the prevalence of the traditional spheres of femininity and masculinity through

the interiorization of the rejection of the non-heterosexual orientation itself. Through this internalization, the rupture that men and women make with respect to normative expressions, roles and desires is punished.

Weinberg (1972) coined the term “homophobia based on self-loathing” to refer to these internalized negative beliefs. According to Herek et al. (2015), the term has been evolving and there are several nomenclatures that are used synonymously, such as internalized heterosexuality, internalized homophobia and internalized homonegativity (the latter two are used interchangeably in the article). The use of one term or another corresponds to discussions about nuances that have been resolved by introducing a meaning to the signifier that includes a range of connotative inferences, cognitions and negative emotions toward the homosexual (López-Sáez et al., 2020). In a heterosexist society, where sexual stigma against heterodissidents is part of the social structure of values (Herek, 2007, 2009), it is not surprising that this structure is internalized as its own through a socialization where the expectations of being heterosexual prevail (Herek et al., 2015). As observed by Allport (1954), a negative consideration of others has adverse effects that affect one’s character. When this occurs, internalized stigma is directed toward self-concept and the experience of desire, generating an associated discomfort for the person (Crocker et al., 1998). Such internal discomfort would be suffered as part of a stressful process resulting from belonging to a minority. Having a dissident sexual orientation can be linked to distal or proximal stress processes, where the former refers to external stressors, such as heterosexist and heteronormative social beliefs, and the latter depends on the self and is related to the assumption of those beliefs (Meyer, 1995, 2003). In the development of identities that challenge gender binarity in some of its terms, proximal stressors generate continued feelings of invalidity and unacceptance (López-Gómez and Platero, 2018; Scandurra et al., 2019a). Therefore, self-stigma and proximal stressors have aversive consequences on physical and psychological health at the intra- and interpersonal levels (Bradford et al., 2013; McLaren, 2016; Scandurra et al., 2017; Moody et al., 2018), as much or more than distal stressors and external stigma (Pachanakis and Bränström, 2018). Because of this, LGB people may hide their orientation or identity (by passing) to cushion the negative distal effects. This adaptation seeks to meet the expectations of the regulatory spheres of gender and sexuality (Scandurra et al., 2019b). However, such actions only generate a kind of persecutory hysteria (Anderson, 2009; Vitelli, 2015) by reinforcing self-stigma and proximal stressors through self-monitoring (Meyer, 2007; Beemyn and Rankin, 2011). For example, the culture of passing is common in spaces like universities, where students adapt their behavior to avoid being associated with what is cis-heterodissident (Pereira, 2009; Bachmann and Gooch, 2018).

To address these personal consequences, a whole range of clinical intervention is available for non-heterosexual individuals through affirmative psychotherapy (APA, 2012). Moreover, to better understand the socio-cultural phenomenon and prevent it, there is an extensive tradition within social psychology for the study of attitudes (Eagly and Shelly, 1993). Attitude analyses related to internalized homonegativity shed more light on this.

One of the most commonly used instruments to measure sexist attitudes to date is the Ambivalent Sexism Inventory (ASI; Glick and Fiske, 1996). According to the theory underlying the ASI, sexism includes both hostile attitudes that directly accept that women are inferior and guileful and less explicit, benevolent attitudes that reinforce the view of femininity as delicate, defenseless, needy and available to men. These two dimensions act as ambivalences, drawing in women who personify traditional femininity and punishing them when they do not reproduce it, all from a position of “chivalry” (Glick and Fiske, 2011). At the same time, a contrary logic is argued in which women try to attract men in order to control them, while the women themselves are romantically objectified as indispensable to the completeness and happiness of the man. To reach this objective, the man presents himself as a provider and protector of the woman (Glick et al., 2004). Consequently, benevolent sexism in all its aspects may seem advantageous for heterosexual women (Hammond and Overall, 2013), who view the man who engages in it as attractive and desirable (Montañés et al., 2013).

Once this necessity is accepted as part of the measurement of sexism, it makes sense to consider the issues that the factor of heterosexuality may raise. As noted above, the influence of sexism on the rejection of anything that deviates from heteronormativity has been studied on several occasions. However, the connection between having a non-heterosexual orientation and sexist beliefs rarely appears in most of the research done (Blumell and Rodríguez, 2019; Cowie et al., 2019). In Spain, no studies on sexism have taken sexual orientation into account as a mediator variable. The studies that have adapted and validated the Ambivalent Sexism Inventory have not even considered the factor relevant to the content validity (López-Sáez et al., 2019).

Thus, the expression of levels of sexism among non-heterosexuals is underexplored. Although they are not as dependent upon heterosexuality, these individuals have suffered the consequences of sexism and may interiorize the attitudes and norms of the patriarchal society in which they grew up. While among heterosexuals, a low resistance to heterosexual norms indicates conservative standards regarding sexual morality and traditional gender roles (Badenes-Ribera et al., 2016), in homosexuals and bisexuals it may be related to a lack of acceptance of one's own orientation as valid for happiness and/or completeness.

Several works have demonstrated the sexist attitudes of homosexual males. One of the defining aspects of hegemonic masculinity is the renunciation and rejection of the feminine (Anderson, 2009; Kimmel, 2017) and the avoidance of homosexuality (Anderson, 2009; Plant et al., 2014). Within anti-femininity, men are also categorized as having a homoerotic desire to be associated with female roles and/or positions (Lehavot and Lambert, 2007). In addition, the rejection of the feminine is a good predictor of anti-gay attitudes (Wilkinson, 2004; Parrott et al., 2011). Despite this, gay and bisexual men are not oblivious to the rejection of the feminine. According to Warriner et al. (2013), the integrated threat theory may explain how the transgression of the hypermasculinity established within the parameters of the sexism inherent in heterosexual desire is sanctioned through external and internal homophobia. In

other words, among gays, the internalization of the construct of masculine femininity as a threat to maintaining social power generates a conflictive self-perception that holds the feminine in contempt and reinforces hegemonic masculinity (Gimeno, 2005; Rodríguez et al., 2016; Murgo et al., 2017; Lovelock, 2019). Thus, despite the evolution of masculinity toward less hegemonic positions, it seems that when men see their masculinity threatened, they react by returning to those more retrograde and hegemonic positions (Falomir-Pichastor et al., 2019).

As a consequence, the internalization of a sexist ethos within gays translates into negative attitudes, first toward women, through misogyny and the invisibilization of groups of women within the homosexual community (Trujillo, 2009; Martínez, 2017) and then toward themselves through internalized homophobia (Borrillo, 2001; Zheng et al., 2017). In fact, Moss (2002) draws a parallel between internalized homophobia and internalized misogyny in that both share a feeling of fear of the feminine. Additionally, these sexist beliefs translate into dynamics of intra-gender violence within homosexual couples as they reproduce heterosexual roles (Frost and Meyer, 2009; Barrientos et al., 2016; Li and Samp, 2019) and into the hierarchized sexual practices that determine who is considered superior (Zheng et al., 2017).

Other instruments also make it possible to measure the less commonly used construct of internalized homophobia and homonegativity. Most of them focus on the gay population (Mayfield, 2001; Currie et al., 2004) and, to a lesser extent, on lesbians (Szymanski and Chung, 2002) and bisexuals (Paul et al., 2014). Roughly speaking, the arguments differentiate between a more explicit or conscious homonegativity and a more implicit or subtle one. The former is based on beliefs that directly reject the non-heterosexual orientation, viewing it as inferior, perverted or abnormal (Mayfield, 2001). The latter demonstrates an *a priori* acceptance of sexual-emotional desire as long as it is homonormative, masculine and, to some extent, relegated to the private sphere (Ross and Rosser, 1996). Therefore, internalized homophobia is defined as “the result of consciously or unconsciously learning the homophobic prejudices, stereotypes, and behaviors that prevail in a heteronormative context” Morell-Mengual et al., 2016, p.1). One of the best-known tools is the Short Internalized Homonegativity Scale (Currie et al., 2004), whose Spanish adaptation and validation was done by Morell-Mengual et al. (2016). The tool is designed to measure subtle internalized negativity in homosexual men in three dimensions: public visibilization and identification as gay; comfort having gay emotional and social relationships; and sexual comfort based on rejecting myths.

As argued above, the presence of sexist attitudes among LGB individuals may be related to a non-acceptance of their own sexual identity, demonstrating a certain amount of internalized homonegativity. By the same token, this lack of self-acceptance, along with high scores for sexism – whether in the heterosexual or LGB population – seems to imply an adaptability to the standards of heterosexual normativity. Studying the dynamic between these constructs, therefore, involves considering the degree of acceptance and/or rejection of hegemonic sexual norms. In this respect, the Polymorphous Prejudice Scale (Badenes-Ribera et al.,

2016) and, in particular, the Resistance to Heteronormative Expectations subscale can be a suitable tool to that end.

This *ex post facto* study (Montero and León, 2007) investigates the relationships between the construct of sexism and internalized homonegativity beyond the theoretical plane. It looks at the differences according to sexual orientation and gender identity and the importance of different variables such as resistance to heterosexual norms, political affiliation and contact with LGB individuals. Since this is an exploratory study, which seeks to intersectionally elucidate the construct of sexism among little-studied populations (such as LGB; López-Sáez et al., 2019), no hypotheses were made beforehand, following a proposal similar to that by (Blumell and Rodriguez, 2019).

METHOD

Participants

A total of 841 students participated from three Spanish universities: Complutense (UCM, $N = 404$), Autónoma de Madrid (UAM, $N = 333$) and Rey Juan Carlos (URJC, $N = 104$). The 1.6% of the participants who were trans, non-binary gender or identified as non-heterosexual and non-LGB were not considered in the data analysis due to the very small sample size. Therefore, the analyzed data correspond to 829 students.

In total, 78.2% of the participants were cis women and 20.7% cis men. The participant ages ranged from 17 to 60 ($M = 20.78$, $SD = 4.02$). 50% were in their first or second years of university and 50% in their third or fourth years.

Instruments¹

Sociodemographic Questionnaire

This included gender identity (1 = man, 2 = woman), sexual orientation (1 = heterosexual, 2 = LGB), age, academic year, lack of contact with LG and B individuals (1 = yes, 2 = no) and political affiliation (1 = left, 2 = center-left, 3 = center-right, and 4 = right-wing). With respect to the last of the four political groups, the proposal from Morrison and Morrison (2002) was followed, where the higher scores reflect greater conservatism. This single-element scale of political affiliation is reliable and valid (Gerbner et al., 1984).

Ambivalent Sexism Inventory (ASI)

We used the short version with the Spanish translation by Expósito et al. (1998). This 12-item instrument evaluates sexism through two subscales that measure hostile sexism (ASI-HS) and benevolent sexism (ASI-BS). Higher scores reflect more sexist attitudes. Rollero et al. (2014) reported a good overall alpha coefficient of 0.83. In this study, it is 0.82.

Short Internalized Homonegativity Scale (SIHS)

The short Spanish version contains 13 items designed to evaluate the internalized negativity of homosexuals and bisexuals. Its three subscales measure comfort with public visibilization and identification as gay (SIHS-PIH); comfort maintaining gay social and emotional relationships (SIHS-SOCC); and sexual comfort (SIHS-SEXC). Higher scores indicate a higher degree of negativity. Morell-Mengual et al. (2016) report an alpha coefficient of 0.80. In this study, it is 0.68.

Like other measurements, the SIHS was developed with a sample of gay men. Its Spanish adaptation included lesbian women, but never bisexual men and women. As such, the content of the articles assumes homosexuality and does not use inclusive and non-sexist language. For that reason, we modified the version to adapt it (for example, we changed “I feel comfortable when other people discover that I’m homosexual” to “I feel comfortable when other people discover that I am not heterosexual”).

Resistance to Heteronormative Expectations Subscale (PPS-RHE)

The Polymorphous Prejudice Subscale, which contains four items, was used. The aim of the PPS-RHE is to evaluate the degree of adherence to the conservative norms governing sexual morality and traditional gender roles. The items were adapted using inclusive language (for example, “I feel restricted by the social expectations that people have for my gender” was changed to “I feel limited by the social expectations that people have for my gender”). Higher scores reflect greater resistance to heteronormativity. Badenes-Ribera et al. (2016) report an alpha coefficient of 0.84. An identical alpha coefficient was obtained in this study.

Marlowe-Crowne Social Desirability Scale (MCSDS)

As a type of control, the short Spanish version was applied (Gutiérrez et al., 2015). This contains 18 items presented as assertions that are accepted or rejected using a true-false response format. Higher scores indicate greater social desirability. Gutiérrez et al. (2015) report an alpha coefficient of internal consistency of 0.76. In this study, it is 0.65.

Procedure

The participants were selected using a stratified random sampling, with proportional allocation for each of the three universities. Out of a total population of 3,745 undergraduate psychology students, the sample size was determined for a confidence level of 95%, maximum variability and a maximum error of $\pm 3\%$. The groups and participants from each academic year were selected at random. During the selection process, a proportional selection criterion was followed according to gender identities. At UCM and URJC, the selected individuals were contacted when attending face-to-face classes, while at UAM they were contacted by email. The rejection rate of the selected individuals was 30%. All the participants received the same instructions and were informed that their participation was voluntary and their responses confidential and anonymous.

¹All of the scales except for the sociodemographic questionnaire and the Social Desirability Scale employed a 6-point Likert scale, ranging from 1 (strongly disagree) to 6 (strongly agree), in order to avoid neutral answer trends and to homogenize the survey information.

Before beginning, they had to read and accept the informed consent. Subsequently, they were provided with a link and went online to participate. The study was evaluated and reviewed by the UAM Research Ethics Committee, which gave its approval.

RESULTS

Descriptive Statistics

71.9% self-identified as heterosexual, 23.3% as bisexual and 4.8% as homosexual. Due to the small number of homosexual individuals, they were grouped together with the bisexuals, leaving an LGB group that was 28.1% of the total. With regard to political affiliation, 42.2% identified with the left, 35.7% with the center-left, 19.5% with the center-right, and 2.5% with the right. Due to the low number of participants affiliated with the right and their ideological proximity to the center-right (Jurado and Riera, 2019), they were grouped with the center-right participants and reorganized as the “right spectrum,” with 21% of the total. Most said that there was a homosexual (90%) or bisexual (83.4%) in their family or friendship circles.

Firstly, descriptive statistics were calculated for the different variables. Then, the factor scores were calculated for each instrument using unrefined methods (in this case, the average of the items for each factor).

Table 1 shows the means and standard deviations by gender identity (man/woman), sexual orientation (heterosexual/LGB), and political affiliation (left, center-left, right-wing spectrum).

Intergroup Comparisons Using Generalized Linear Models

To study the differences in the different levels of the constructs measured, an analysis of covariance was carried out for each of the scales, using the following factors: gender identity (man and woman), sexual orientation (heterosexual and LGB), and political affiliation (left, center-left, right-wing spectrum). Social desirability was included as a co-variable in all the analyses. Due to the asymmetry of the dependent variables, the ANCOVAs were discarded for generalized linear models. The results according to each attitudinal variable are given below.

With regard to ASI-HS, the results show a significant effect in the interaction between gender identity and sexual orientation [$F(1,816) = 12.45, p < 0.001, \eta_p^2 = 0.02$]. As seen in **Figure 1** (upper section), this type of interaction requires a simple-effects analysis to be interpreted without error (see León and Montero, 2015). The simple-effects analyses for sexual orientation show that for both women [$F(1,652) = 20.17, p < 0.001, \eta_p^2 = 0.0$] and men [$F(1,171) = 28.56, p < 0.001, \eta_p^2 = 0.14$], heterosexuals score higher than LGB for this type of sexism. On the other hand,

TABLE 1 | Means and standard deviations by gender identity and sexual orientation.

Left	Heterosexuals				LGB			
	Women		Men		Women		Men	
	M	DE	M	DE	M	DE	M	DE
Hostile sexism (ASI-HS)	1.26	0.49	1.58	0.76	1.18	0.30	1.23	0.30
Benevolent sexism (ASI-BS)	1.75	0.61	2.08	0.98	1.67	0.49	1.89	0.65
Heteroresistance (PPS-RHE)	3.86	1.41	2.27	1.25	4.41	1.11	4.69	1.23
Public identification (SIHS-PIH)	–	–	–	–	2.47	0.89	2.61	1.07
Sexual comfort (SIHS-SEXC)	–	–	–	–	1.28	0.53	1.46	0.62
Social comfort (SIHS-SOOC)	–	–	–	–	1.76	0.55	1.94	0.88
Social desirability (MCSDS)	0.45	0.17	0.42	0.21	0.44	0.17	0.38	0.17
Centre-left								
Hostile sexism (ASI-HS)	1.55	0.56	2.13	0.84	1.40	0.59	1.62	0.69
Benevolent sexism (ASI-BS)	1.99	0.68	2.16	0.66	1.83	0.65	2.06	0.68
Heteroresistance (PPS-RHE)	3.20	1.41	2.74	1.34	4.22	1.29	4.82	1.58
Public identification (SIHS-PIH)	–	–	–	–	2.41	0.77	2.90	1.05
Sexual comfort (SIHS-SEXC)	–	–	–	–	1.29	0.48	1.95	1.10
Social comfort (SIHS-SOOC)	–	–	–	–	1.83	0.63	2.34	1.12
Social desirability (MCSDS)	0.41	0.15	0.44	0.18	0.46	0.17	0.43	0.18
Right-wing Spectrum								
Hostile sexism (ASI-HS)	1.85	0.72	2.77	1.05	1.99	0.94	1.92	0.97
Benevolent sexism (ASI-BS)	2.24	0.73	2.59	1.20	2.36	0.99	2.67	1.13
Heteroresistance (PPS-RHE)	2.56	1.48	2.32	1.36	4.15	1.91	4.88	0.95
Public identification (SIHS-PIH)	–	–	–	–	3.00	1.08	2.67	1.03
Sexual comfort (SIHS-SEXC)	–	–	–	–	1.70	0.70	1.92	0.52
Social comfort (SIHS-SOOC)	–	–	–	–	2.11	0.81	2.00	0.40
Social desirability (MCSDS)	0.44	0.16	0.45	0.19	0.39	0.17	0.56	0.00

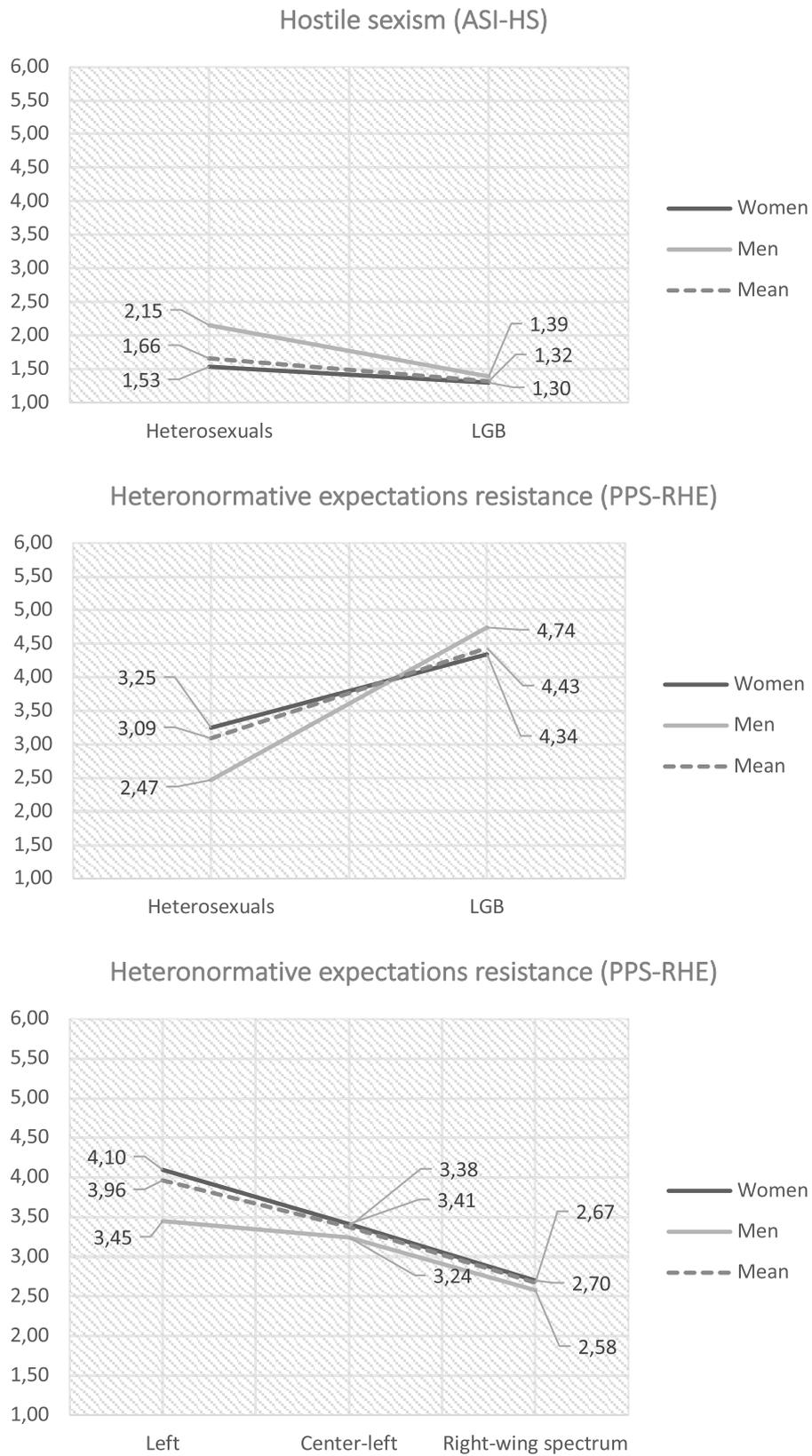


FIGURE 1 | Graphs of significant interactions.

the simple-effects analyses for gender identity show that for ASI-HS, there are only significant differences between heterosexual men and women [$F(1,593) = 72.04, p < 0.001, \eta_p^2 = 0.11$], while the same does not occur between LGB men and women [$F(1,230) = 1.21, p = 0.27, \eta_p^2 = 0.01$].

As political affiliation was not involved in any of the interactions, the primary effect was interpreted directly. In ASI-HS, then, people affiliated with the right-wing spectrum scored higher than those affiliated with the left [$F(2,816) = 40.98, p < 0.001, \eta_p^2 = 0.1$].

There were no significant interactions in ASI-BS. As in ASI-HS, the primary effects of gender identity and political affiliation were significant in ASI-BS, with men scoring higher than women [$F(1,816) = 9.28, p = 0.002, \eta_p^2 = 0.01$] and people on the right-wing spectrum scoring higher than those on the left [$F(2,816) = 14.58, p < 0.001, \eta_p^2 = 0.04$].

Regarding PPS-RHE, the results show a significant effect in the interaction between gender identity and sexual orientation [$F(1,816) = 15.19, p < 0.001, \eta_p^2 = 0.02$] and between gender identity and political affiliation [$F(2,816) = 4.52, p < 0.05, \eta_p^2 = 0.01$]. As seen in **Figure 1**, the simple-effects analysis indicates that LB women have higher levels of PPS-RHE than heterosexual women [$F(1,648) = 39.83, p < 0.001, \eta_p^2 = 0.06$] and GB men higher than heterosexual men [$F(1,167) = 67.92, p < 0.001, \eta_p^2 = 0.3$]. In other words, regardless of gender identity, the level of PPS-RHE among LGB individuals rises in comparison with heterosexuals. On the other hand, regardless of their sexual orientation, tending toward the right

produces lower levels of PPS-RHE in women [$F(2,648) = 9.3, p < 0.001, \eta_p^2 = 0.03$]. There were no significant differences for men between the left and right [$F(2,167) = 0.76, p = 0.5, \eta_p^2 = 0.01$]. The SIHS variables had no primary effects or significant interactions.

Correlations and Multiple Regression Analysis

A bivariate correlation analysis was done, adding the “lack of contact” and “internalized homonegativity” (SIHS) variables with LGB. Correlations were estimated using Pearson’s coefficient and can be seen in **Table 2**, which shows the correlations of attitudinal and socio-demographic variables with ASI-HS and ASI-BS for LGB and heterosexual men and women.

Additionally, a multiple regression analysis was carried out using the stepwise method. First, ASI-HS and ASI-BS were predicted based on gender identity, sexual orientation and political affiliation. Therefore, all the sociodemographic variables in the sample were used, except for the “contact” variables, which were discarded due to their unclear correlations.

Secondly, the predictions related to sexism in the heterosexual sample were made using PPS-RHE and political affiliation, while in the LGB sample, they were made using the SIHS (SIHS-PIH, SIHS-SEXC and SIHS-SOOC), PPS-RHE and political affiliation dimensions. For both samples, the analyses were done separating the LGB and heterosexual men and women.

The results of this analysis are shown in **Tables 3–5**.

TABLE 2 | Correlations by gender identity and sexual orientation.

	Heterosexual				LGB			
	Women		Men		Women		Men	
	Hostile sexism (ASI-HS)	Benevolent sexism (ASI-BS)	Hostile sexism (ASI-HS)	Benevolent sexism (ASI-BS)	Hostile sexism (ASI-HS)	Benevolent sexism (ASI-BS)	Hostile sexism (ASI-HS)	Benevolent sexism (ASI-BS)
Heteroresistance (PPS-RHE)	-0.25**	-0.18**	-0.16	-0.16	-0.07	-0.07	0.07	0.09
Public identification (SIHS-PIH)	-	-	-	-	-0.03	0.07	0.22	0.41**
Sexual comfort (SIHS-SEXC)	-	-	-	-	0.27**	0.27**	0.36**	0.35*
Social comfort (SIHS-SOOC)	-	-	-	-	0.08	0.17*	0.14	0.41**
Political affiliation	0.36**	0.28**	0.47**	0.21*	0.40**	0.27**	0.43**	0.26
LG lack of contact	0.02	-0.01	0.18	0.14	-0.06	-0.04	0.04	-0.02
B lack of contact	0.19**	0.15**	0.28**	0.22*	-0.02	-0.03	0.18	0.19

* $p < 0.05$; ** $p < 0.01$.

TABLE 3 | Multiple regression of sociodemographic variables.

	Hostile sexism (ASI-HS)			Benevolent sexism (ASI-BS)		
	β a	R2	Change	β a	R2	Change
Political affiliation	0.35	0.17a	0.17***	0.27	0.08a	0.08***
Gender identity	-0.44	0.24b	0.06***	-0.25	0.10b	0.02***
Sexual orientation	-0.17	0.25c	0.01**	-	-	-

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. a: first predictor, b: second predictor adding the previous one, c: third predictor adding previous ones.

TABLE 4 | Multiple regression as a function of variables in the heterosexual sample.

	Hostile sexism (ASI-HS)			Benevolent sexism (ASI-BS)		
	β a	R ²	Change	β a	R ²	Change
Women						
Political affiliation	0.31	0.13a	0.13***	0.24	0.08a	0.08***
Heteroresistance (PPS-RHE)	-0.15	0.15b	0.02**	-0.09	0.08b	0.01*
Men						
Political affiliation	0.47	0.22a	0.22***	0.21	0.03a	0.04*
Heteroresistance (PPS-RHE)	-0.17	0.25b	0.03*	-	-	-

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. a: first predictor, b: second predictor adding the previous one, c: third predictor adding previous ones.

TABLE 5 | Multiple regression as a function of variables in the LGB sample.

	Hostile sexism (ASI-HS)			Benevolent sexism (ASI-BS)		
	β a	R ²	Change	β a	R ²	Change
Women						
Political affiliation	0.26	0.14 ^a	0.14***	0.22	0.11 ^b	0.05**
Sexual comfort (SIHS-SEXC)	0.19	0.19 ^b	0.05***	0.25	0.06 ^a	0.07**
Men						
Political affiliation	0.23	0.15 ^a	0.15**	-	-	-
Sexual comfort (SIHS-SEXC)	0.15	0.22 ^b	0.07*	-	-	-
Social comfort (SIHS-SOOC)	-	-	-	0.32	0.17	0.17**

* $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$. a: first predictor, b: second predictor adding the previous one, c: third predictor adding previous ones.

First, in the sample set, political affiliation, gender identity and sexual orientation have a good effect size, making it possible to explain 25% of the variance for ASI-HS. Something similar occurred with ASI-BS, although here sexual orientation lost its predictive value and the other variables only explained 10% of the variance.

Among heterosexual women, both PPS-RHE and political affiliation explained between 8% (for ASI-BS) and 15% (for ASI-HS) of the variance. Among LB women, political affiliation remained, but PPS-RHE lost predictive potential and SIHS-SEXC gained, with the variance percentage rising to between 11% (for ASI-BS) and 19% (for ASI-HS).

Among heterosexual men, PPS-RHE and political affiliation repeated prediction, with the variance increasing to 25% for ASI-HS, but only political affiliation had a low predictive potential for ASI-BS (3% of the variance). Among GB men, political affiliation and SIHS-SEXC explained 22% of the variance for ASI-HS, while 17% of the variance for ASI-BS was explained by SIHS-SOOC.

DISCUSSION

This study makes it possible to explore the differences between heterosexuals and LGB individuals with respect to the degree of sexism. It also facilitates a better understanding of other variables that may influence levels of sexism among both men and women in the heterosexual population and, specifically, the LGB population.

The results of the analysis of covariance reaffirmed the importance of gender identity (the fact of being a woman or

a man) to differentiate the two sexismisms. Additionally, these differences occur on the basis of sexual orientation (heterosexuals and LGB) and are more obvious in the sample of heterosexual men and women. Political affiliation is another variable that is a good indicator of the degree of sexism. In general, the results showed a lower degree of sexism among women, LGB individuals and people on the left.

These same groups, in turn, usually show greater resistance to adherence to conservative norms regarding sexual morality and roles (PPS-RHE). This concurs with theories about the sex/gender/sexuality system (Westbrook and Schilt, 2014) that regard the heterosexual man as a privileged subject to the detriment of everyone else. According to this theory, a pyramid exists with different levels that enjoy a framework of privileges to a greater or lesser extent according to their proximity to the top, which is occupied by the cis man with a traditional, heterosexual masculinity.

For example, in our study, GB men with higher levels of ASI-BS than all the groups of women would be on a particular level of the pyramid. Moreover, the differences between groups regarding political affiliation (despite not being significant) indicate a slight trend. Even among people who belong to so-called “oppressed groups,” individuals on the right-wing spectrum have levels of sexism that are as high as those on the top of the pyramid. Therefore, it appears that despite reprisals for disturbing the *status quo*, LGB individuals can exhibit sexist attitudes when conservative parameters come into play.

These results show that being LGB and having sexist attitudes correlates with the components of internalized negativity, especially SIHS-SEXC. This means that the assumption of

sexist canons can be associated with the belief that the correct sexuality adopts roles and morality in accordance with what is established by the heterosexual model (Warriner et al., 2013; Fogel, 2016). Moreover, at least in theoretical terms, there is a possibility that the components of sexism regarding heterosexual intimacy and gender differentiation stipulate a self-LGB-negativity. This sexism promotes non-identification and the negation of sexual and social interactions with LGB individuals.

The intersection of the gender identity variable influences the intensity of the correlations between SIHS and sexisms. Among GB men, for example, the correlations were higher and had greater significance. This could be related to the relationship that can be established between the consideration of femininity as a threat to the social role of GB men (ASI) and the fear of being associated with aspects of femininity linked to homoeroticism (SIHS). Here, individuals who participate in homonormative logic (López-Sáez, 2017) come into play, for example: “I am gay, but I am masculine and I like masculinity.” The fear of losing male privilege that is implied by femininity once again reveals the pyramid of social hierarchies (Taywaditep, 2002; Johnson and Samdahl, 2005).

In the heterosexual sample, both PPS-RHE and a lack of contact with bisexuals had the greatest correlations with sexism. With respect to PPS-RHE, this greater correlation and significance in the heterosexual sample could be due to the different implications related to breaking away from heteronorms. For heterosexuals, this split could entail a reconsideration of the traditional spheres of masculinity and femininity on which the components of sexism are based. LGB individuals, on the other hand, have no need to do this, and the low correlation seems to indicate a coexistence between resistance to heteronorms separate from sexist beliefs. However, among LGB individuals, this coexistence is associated with beliefs that produce self-stigmatization toward their own orientation in different areas and sexist beliefs.

With respect to the correlation between a lack of contact among heterosexuals with bisexuals and sexisms, it appears that contact could have an influence on protecting against sexism, at least among heterosexuals. However, the lower correlations regarding the lack of contact with LG individuals and the ambivalences in the correlations in the LGB sample suggest that this assertion be handled with a degree of caution. Contact with LGB individuals, who violate traditional gender expressions and roles, could be a protective factor by raising awareness about violence based on sexism. However, in societies like the Spanish one, where LGB individuals are widely accepted socially and easy to meet, simple contact is not always related to these protections (Badenes-Ribera et al., 2016; Lopes et al., 2017). Moreover, as Allport (1954) observes, contact with persons belonging to minority groups is not sufficient to reduce prejudice.

Again, the political affiliation variable is particularly important with respect to the correlation analyses. Political affiliation is significant in almost all the sample groups, both LGB and heterosexual women and men. This indicates the important influence of this variable. A large number of

studies have identified the association between sexism and a right-leaning political affiliation (Warriner et al., 2013; Austin and Jackson, 2019). In this respect, predictive analyses make it possible to have a more comprehensive view of the degree of influence of this and other variables. The variable with the greatest predictive potential for both sexisms in the sample set was political affiliation, followed by gender identity. Sexual orientation added only very slightly to the variance level and only in the case of ASI-HS. In the heterosexual sample, PPS-RHE also added a very small variance, which was null for ASI-BS and among men.

In the LGB sample, SIHS-SEXC was the variable that most often improved the variance level explained by political affiliation. However, this was not the case for the group of GB men, since only SIHS-SOOC was an adequate predictor for ASI-BS. The lack of prediction for ASI-BS by political affiliation among GB men could be important, since it would indicate that a change in political affiliation in this group and for this sexism is not as relevant as SIHS-SOOC.

CONCLUSION

A whole host of works have shown how sexism permeates different gender identities, cultures, studies and professions. There is an essential need to include an intersectional perspective in empirical research in order to obtain a comprehensive and holistic view of sexism. Intersectionality facilitates analyses that visibilize the different mediating and predictive variables that come into conflict or form part of the “bricks of the wall of oppression” (Ahmed, 2018). In this context, this study sheds light on the state of the question and the limitations.

First, the clear shortage of works that explore the question of sexual orientation with a focus on analyzing sexism in the LGB population was the motivating factor behind this study. Here, the analyses have revealed – contrary to reasonable logic – how a group that is subjected to oppression itself can at the same time hold negative attitudes toward other groups and even toward itself. In other words, it appears that LGB individuals learn negative hegemonic attitudes about women and/or femininity in a way that is similar to the interiorization of negativity and they support them, regardless of the harmful impact on their own wellbeing.

Additionally, the study of sexism in LGB individuals has raised some thought-provoking questions. The ASI to measure ASI-BS considers the dimension of heterosexual intimacy for a population that does not practice that intimacy. While it is true that LGB individuals could adopt sexist internalization for themselves and view this intimacy as suitable, they might not, instead accepting other ASI-BS parameters such as the care and protection of women and the feminine. However, in the latter case, although homosexual men have some levels of ASI-BS, they will always score lower than heterosexual men. This is a point of interest in terms of homonormativity, in which resistance to heterosexuality is assumed, but the other components of sexism are accepted and, consequently, the feminine is disparaged.

Secondly, the results indicate that being a psychology student is no guarantee of being free of sexist attitudes, of recognizing the pressures of dominant sexual normativity, or of having less self-stigma (in the case of being LGB). Although the current situation regarding the skills and information gap surrounding the construct of sexism has been brought to light here, no meta-analysis was done with other works that would have produced a detailed comparison of its extent.

All of these discoveries and questions require further study to better understand the complex relationships and mechanisms related to sexism and internalized LGB-negativity, particularly in the LGB community. Resolving the limitations related to the random selection in our study (without being able to consider sexual orientation beforehand – 596 heterosexuals, 40 homosexuals and 193 bisexuals) and increasing the sample size are necessary steps for future work. An exploration of more heterogeneous probability samples would also be beneficial, given that the results are only representative of the public university system in the Community of Madrid. In that respect, the population of psychology students is feminized, does not adhere to very conservative ideologies and is far from ethnically and culturally diverse.

Additionally, future directions should review the ASI to assess an adaptation of the scale for people without heterosexual desire. Similarly, improving the use of the variables by incorporating new ones or reconfiguring the existing variables (by evaluating the type of personal contact connection, for example) is called for. Finally, longitudinal studies would make it possible to contrast how learning evolves in psychology and to evaluate the changes that may occur as the student progresses through the program.

In conclusion, the benefits of exploring a broader panorama of the factors that intersect in sexism would lead to better diagnoses and a more holistic understanding of the phenomenon.

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DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Comité de Ética de la Investigación de la Universidad Autónoma de Madrid. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

ML-S was the principal author and the one who has contributed most to the manuscript presented here, was elaborated the theoretical framework that supports the article, as well as the realization of the different analyses that were presented. DG-D was one of the contributors who have focused on making contributions to the theoretical framework and the final discussions. IM was one of the contributors who focused on making contributions to the statistical analysis and discussions derived from it. All authors contributed to the article and approved the submitted version.

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Gender Participation and Preference: A Multiple-Case Study on Teaching Circus at PE in Brazilians Schools

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Introduction: After more than a decade monitoring physical education instruction in Brazilian elementary schools we noticed an exponential increase in circus activities in both curricular physical education (PE) and in after-school programs. The purpose of this study was to analyze the children's participation and gender preferences in circus activities, with regard to recent studies reporting substantial gender inequalities in Brazilian PE.

Method: A qualitative study, based on multiple-cases design, was conducted in two public and six private Brazilian elementary schools. Data collection consisted of 17 semi-structured interviews with PE teachers and school administrators and *in situ* observations totalizing more than 130 h. The data were analyzed using Content Analysis (thematic categories).

Results: Boys and girls showed high participation levels in both curricular and extracurricular PE circus activities. In grades 1–5, participant activity preference was not linked to gender in either curricular or extracurricular situations and overall physical engagement was high. Gender preferences between activities were identified in grades 6–12: girls for aerial activities (trapeze, silks) and boys for juggling activities. Teacher preferences played an important role in the process of linking activities to specific genders both through modeled behavior and gendered encouragement of participants.

Conclusion: Circus instruction engages children of all genders and is thereby an effective activity to counter low participation in PE for boys and, especially, girls. Although circus activities are not inherently gendered, gender preferences are cultivated by teachers through gendered behavior modeling (their activity preferences) and encouragement strategies (guiding students to activities based on gender), which is often observed in traditional PE school activities and sports.

Keywords: art education, circus instruction, teachers education, physical education (P.E.), pedagogy

INTRODUCTION

The current study seeks to understand whether circus in PE influences student participation when compared with traditional PE activities. The benefits associated with Physical Education (PE) at school are widely documented (Bailey, 2006). As with other areas of contemporary society, gender asymmetry and inequality influences the way students access and experience school activities including sport, art and education (Garcia, 2007; Evans, 2017; Stride et al., 2018). In PE, gender differences have been observed with regard to access, participation and interest in the field (Metcalf, 2018). In many places school PE follows this trend, with gender participation unequal, uneven and problematic (Del Castillo-Andrés et al., 2013). Achieving gender parity in PE remains an important challenge that merits inclusion in all discussions of PE activities (Lentillon et al., 2006). Adequate teacher education about the challenges to gender equality, and potential solutions, is one way to work toward gender parity (Hills and Croston, 2012). Whether intentional or unconscious, teachers' approaches for students of different genders influence student participation and preference for different activities (Garcia, 2013). For this reason, there have been sustained efforts in Brazil to promote gender equality in school PE, using a critical approach to navigate the internal (curricular, administrative) and external (social, cultural) tensions and conflicts of school programs (Cardoso et al., 2005; Ferreira et al., 2016). We are therefore interested not only in overall participation in circus activities, but specifically interested in whether participation in circus PE activities replicates or reduces the gender asymmetry seen in other PE activities.

The group of researchers undertaking this project have dual expertise in PE and circus education. After more than a decade following the slow development of circus teaching in Brazilian elementary and high schools (grades 1–12), we recently noted an exponential increase in the implementation of circus programs in curricular PE and as an extracurricular activity. Teaching circus at school became popularized in the late 1990s (Ontañón et al., 2012; Price, 2012), which led to official documentation by the federal government and some states incorporating circus as standard curricular content. Brazilian educational authorities are not alone in recognizing that circus can positively contribute to student physical and social development (Duprat et al., 2014), many other countries worldwide also include circus arts in educational practices (Garcia, 2007, 2013; Bertin-Renoux, 2019; Kriellaars et al., 2019; Neave et al., 2020).

In response to the recent increase in school-based circus instruction in Brazil, we undertook a long-term research project that follows circus instruction in different elementary and high schools toward a better and broader understanding of the relationship between circus and school structures (curricular, extracurricular, instructional methods, financial engagement, and learning experiences). We analyze the implementation process, the methodologies used and the results of these experiences from the educators' perspectives (teachers and schools administrators). In this article, we discuss overall student engagement in circus activities when compared with traditional PE activities, as well as the influence of gender preferences

in PE circus instruction on engagement. To better understand what influences student engagement, we include program information about implementation, financial investment and teacher education as a means of discovering whether similar gendering processes happen in circus instruction and traditional PE activities (Berg and Lahelma, 2010).

METHODS

Study Design

Our approach is grounded in the quest to directly observe the pedagogical process, and the questions that arise within it, as suggested by Hunter (2014) and Jachyra et al. (2015). With the aim of better understanding circus instruction in schools, we chose a qualitative methodological stance enabling the participants to remain the experts of their own experiences. Because the only common points between our different sites are circus activities taught within schools in Brazil, we chose a multiple-case study method that allowed us to observe the particularities of each circus case (Thomas, 2011; Ashley, 2013) was conducted. An interpretive naturalist's perspective (Thomson, 1981) was adopted to preserve the "naturalness" of the environment by considering the particular context of each school's PE classes (Lewis, 2014). We were also attentive to how memory construction is connected to place through direct experience, and subsequently the way to teach memory preservation (Lincoln and Guba, 1985). Each case study that makes up this research were carried out under the same epistemological and methodological framework.

Participants

Brazilian basic education is organized in three levels (Early Childhood Education <0–6 years of age>; Elementary Education <cycle I 6–10 years, and cycle II 11–14 years>; and High School <15–17 years>) (Brasil, 2018). This research considers that our study reaches two of these three levels, Elementary and High School.

For the selection of schools, we adopted two non-probabilistic procedures: convenience sampling and "snowball" sampling (Bolfarine and Bussab, 2005). In the convenience sampling process, we contacted dozens of PE teachers in order to identify those who worked with circus activities at school. We asked these professionals to indicate other contacts that could fit in the research, thus professionals indicated new professionals that increased our "snowball" sample. The main inclusion criterion was that the teacher needs to be working for at least 2 years at school and be responsible for teaching circus. To ensure case diversity, three other criteria were considered: administration (public/private); location (city and state); educational program (curricular/extra-curricular). When multiple schools met the criteria, preference was given to schools with longer circus teaching experience.

Two public and six private schools located in four different states (São Paulo, Minas Gerais, Paraná, and Rio Grande do Sul) in the south and southeast regions of Brazil were selected for this study. The schools taught circus in elementary or high

TABLE 1 | School descriptions.

School administration	Province	PE program	Grades	Group average/number of students	Teachers (by gender)	Interviews	<i>in situ</i> observation
(1) Private	São Paulo	E-C	Grade 1–12 (12 groups)	Minimum 8 Maximum 33 per group; 225 students	3 (male); 2 (female)	2 (1 C, 1 T)	6 days 18 h
(2) Private	Paraná	E-C	Grade 1–12 (6 groups)	Minimum 5 Maximum 13 per group; 60 students	1 (male); 1 (female)	4 (1 C, 2 T and 1 D)	2 days 8 h
(3) Public (State)	Rio Grande do Sul	CL–PE	Grade 1–3 (3 groups)	Minimum 10 Maximum 12 per group; 30 students	1 (female)	3 (1 C, 1 D and 1 T)	3 days 12 h
(4) Public (municipality)	São Paulo	CL–PE	Grade 2–5 (10 groups)	Minimum 18 Maximum 24 per group; 200 students	1 (female)	2 (1 C, 1 D, 1 T)	8 days 40 h
(5) Private	São Paulo	CL–PE	Grade 8 (1 group)	25 students	1 (female)	2 (1 C, 1 T)	2 days 4 h
(6) Private	Minas Gerais	C–CIRCUS	Grade 3–9 (10 groups)	Minimum 5 Maximum 15 (average 12); 120 students	1 (male)	2 (1 C, 1 T)	3 days 15 h
(7) Private	São Paulo	CL–PE	Grade 1–4 (4 groups)	25 in average; 100 students	1 (male)	1 (T)	15 days 27 h
(8) Private	São Paulo	CL–PE	Grade 10–12 (3 groups)	20 in average; 60 students	1 (male)	1 (T)	5 days 8 h
TOTAL	4	2 E-C; 5 PE CL; 1 C-CIRCUS	49 groups	820	7 male; 6 female	17 interviews	44 days; 132 h

C, Pedagogical Coordinator; T, Teacher; D, School Director/Principal; E-C, Extra curricular; CL, Curricular; C, CIRCUS Curricular Circus Arts.

school level (grade 1 to 12–USA educational system), and had PE teachers in charge of these activities for at least 2 years (**Table 1**).

School Principals and PE Teachers provided consent prior to participation. Ethical approval was obtained from the Research Ethics Council by the University of Campinas (CAAE: 66614417.3.0000.5404).

Procedures

The access to the schools was negotiated directly with the person responsible for Physical Education and with the School Principals. All PE teachers voluntarily participated in the study. Using participant observation (Spradley, 1980) we followed 49 PE groups (two private schools; six public schools). More than 800 students were observed in 49 different groups over more than 130 h of *in situ* observations.

Several criteria were applied to observers for this research. Observers were always made by external researchers who had no active participation in the implementation process design, and no previous link with the schools and PE teachers. The selected observers are experienced in teaching circus in PE, and trained in interview and observational methodology.

The observations followed the placement guidelines of Woods (1986) and Anguera et al. (2017), and the data were recorded in field notebooks. The procedures used in the observations were applied in the same way for all cases. In order to create an environment of empathy, as suggested by Wacquant (2006), and also to build a “participative observation” (Jachyra et al., 2015), the observers used the following strategy: they did not actively participate in any activities, but slowly built interactions with participants over time, especially with those who spontaneously approached the observer. The field notes were made during observation and a post-observation written in the field diary. Such records are important for the analysis and discussion of data, seeking a global understanding of the phenomenon (Wacquant, 2006). Later, the field diaries were transcribed in a text editor (.doc).

Additional information obtained in informal conversation with the PE teachers was added in the form of memos to complement observational notes that were still diffuse or incomplete. Each researcher was responsible for the observations in two schools and all participated in the subsequent analysis of the data.

Looking for a deeper understanding of social reality, based on testimonies of the subjects involved 17 semi-structured interviews were conducted with 9 PE Teachers, 6 school Pedagogical Coordinators, and 3 School Principals. The interviews were scheduled in places and times indicated by the interviewees during the observational period each school. After the transcription of the recordings (audio) the participants were invited to review the testimonials. For the purpose of this multi-case study, the analyzes of the interviews were reviewed considering the thematic catechographs described below.

The interviews with teachers aimed to understand personal and professional backgrounds in circus and the reasons to include it in the school context. Pedagogical coordinators and directors were asked about the recognition, support and promotion of the circus instruction at the selected schools. All interviews were recorded in Audio (MP3 format) and later transcribed by the researcher responsible for each case (school) in a text editor (.doc) for further analysis.

A pilot study including interviews and observations in two local schools was conducted previously, aiming to linguistically improve the instruments and training all researchers involved.

In qualitative research, each case is considered as unique (Stake, 1995). As demonstrated, data collection sought to understand the different contexts of each school (economic extract of the population; qualification of the teachers; type of administration; etc.). Rather than comparing schools, these data were analyzed separately for a rich description of each site. In some cases, patterns that arise in each site can be compared. For the purpose of this paper, we include data related to participation in activities and gender preferences related to participation.

Analytical Perspective

All researchers were trained in the Content Analysis method. The data were analyzed by developing thematic categories through Content Analysis (Krippendorff, 2004) and interpreted into those categories using a critical hermeneutics lens (Bourdieu and Wacquant, 1992). Data transcriptions were read multiple times, each time developing and applying codes and seeking to reduce and systematize codes into categories. Thematic categories were created from recurring patterns and codes (e.g., experience of circus teaching, experience of the implementation process, resource allocation) (Denzin and Lincoln, 2011). Codes developed from observational data were contrasted with the interview codes, the convergence and divergence of which contributed to the consolidation of the thematic categories (Anguera et al., 2017).

Through successive readings we obtained a set of common categories herein presented and discussed. Ultimately four thematic categories provided a framework for understanding both observational and interview data related to participation and gender: (a) Teachers (education; circus training; gender); (b) Schools (implementation process; facilities; circus equipment; and policies); (c) Pedagogical aspects (classes organization; circus disciplines teaching; didactic strategies); (d) Students (participation; gender preferences;...). Data collected from each case (school) were analyzed by the researcher responsible for the project and, independently, by his or her adviser. In the second

stage, all researchers (5 in total) accessed and re-analyzed the data, trying to improve the analytical consistency.

Findings are presented in narrative text to better reflect the experiences of the participants, to articulate the themes (categories), and to foreground the contexts of each school (Thomson, 1981; Bourdieu and Wacquant, 1992; Garrett, 2006).

RESULTS

What Was the Implementation Process?

Drivers of Implementation

In most of the schools the implementation of circus instruction in PE was initiated by individual teachers (Schools 2, 3, 4, 5, 6, 7, and 8). Only in one school (1) was the circus activity implemented through administrator initiative. The teacher emerges as the central figure in the circus implementation process, although he or she is not the only one responsible for this process, as previously suggested (Price, 2012; Ontañón et al., 2013).

Whereas, many PE teachers have reported feeling intimidated to initiate teaching new disciplines, including circus, teachers who implemented circus activities demonstrated “teaching courage” through their perseverance and problem-solving attitude during the implementation process (Ward, 2001). Because it was the teachers’ personal initiative that was the main trigger for the inclusion of circus activities, almost all PE teachers indicated a clear motivation that influenced their desire to integrate PE and Performing Arts into the context of school PE. The teacher at School 8 reports the drive to include circus comes from a belief that circus is:

[...] an activity that greatly enriches PE complementing the other contents that exist within it and brings new elements of artistic expression into the area that until then was somewhat overshadowed by sports and other content that are now being rescued (Roberto–School 8 teacher).

Context of Implementation

The longest-running program in this study is School 8, which began in 1995. Four circus programs launched in the 2000s (Schools: 1, 4, 6 and 7) and three were started 2010 (2, 3, and 5). We believe that this process may be the legacy of the profound changes undergone by Physical Education in Brazil during the 1980s as a result of the re-democratization (end of the civil-military dictatorship) and the institution of a new Federal Constitution. Ontañón et al. (2012) note that during this period, education was given new roles that led to a movement for educational renewal. By the 1990s, these transformations had prompted changes in institutional approaches to PE (educational guidelines, curriculum parameters, etc.). PE objectives, content and didactic strategies were now connected to cultural education, which strongly influenced the PE curriculum.

Although it was not a uniform movement throughout Brazil, the impacts of the cultural paradigm PE approach reached the education of teachers and, later, their performance in schools. Thus, it was in the 2000s that a group of teachers trained under the influence of the cultural paradigm entered the schools. When compared with experiences in other countries with no similar rise

in PE circus activities (Bolton, 2004; Price, 2012; Coasne, 2013; Kriellaars et al., 2019), our preliminary hypothesis is that the cultural perspective of education made it possible to implement other content, such as the circus, in school Physical Education.

Economy of Implementation

While the majority of programs were implemented by teachers after the year 2000, a tremendous diversity of conditions was observed in each school. Resource allocation and availability was one of the most variable factors.

Systemic differences in educational conditions correlate with the different systems of school funding, with resource inequality linked to the asymmetrical financing of Brazilian education. Socioeconomic conditions play an important role in access to equitable education, as suggested by Bourdieu and Wacquant (1992). All programs receive some form of support from the school management team and sufficient space to develop the circus activities. Resources of space and equipment vary considerably, however, in connection to the differential funding of education in Brazil. In the public sector, the federal government is responsible for Higher Education; the states fund Elementary School II and High School; and the municipalities are responsible for Early Childhood Education and Elementary School I. This results in substantial inequalities in educational investment. In addition, the process of privatizing education must also be considered, where schools are funded primarily by the families of students which places different pressures on the curriculum but can also liberate the financial structure from reliance on government funding. Overall, private schools in this study have better conditions in facilities and equipment. The private (non-profit) schools clearly use “circus” as a school promotion strategy to draw students into their programs.

Most schools invested in equipment for circus activities. Financial investment for the purchase of circus and safety equipment (e.g., mattresses) was mentioned in interviews from Schools 1, 4, 5, 6, 7, and 8. Three schools made substantial investments in the purchase of equipment (1, 6, and 8), which was an important facilitator of the implementation process. However, in two of these schools (5 and 7), teachers still had to bring some personal equipment in order for the programs to operate. In Schools 2 and 3 teachers used their own circus equipment to teach. Only two of the private schools (1 and 6) showed sufficient investment in the materials.

In contrast, public schools (3 and 4) do not offer financial support, although they do not hamper the action of teachers. School 4 does not have specific circus equipment and therefore depends on the creativity, effort and resources of the teacher, who often prepares juggling apparatus at home for use at school. To combat the non-availability of circus equipment, teachers report artisanal manufacture (e.g., juggling) or the use of equipment borrowed temporarily. Teachers identify low support, especially lack of adequate equipment, as a factor that significantly limits the quality of teaching and learning circus. The teacher of School 3 finds that:

In fact, the challenges are quite large [...] we don't have many resources [and] often end up limiting [...] a sequence at work

[...]. And because it is a public school [the lack of materials] ends up limiting, because you need material to make [the activities]. So, this is one of the main challenges (Sara–School 3 teacher).

We note that the lack of investment to purchase circus equipment, even when it constitutes a major challenge, does not prohibit teaching circus at school. By relying on motivated teachers, some solutions are created and, over time, schools tend to change their position and increase support.

Curricular Location of Implementation

From a school administrative perspective, three models were observed: circus activities in extracurricular programs (1 and 2); as part of the PE curriculum (3, 4, 5, 7, and 8); and having circus as a subject in the general curriculum program (6). Within these three models, there are still many variations. In Schools 1, 2, 6, and 8, circus is well-integrated into the pedagogical project, well-supported by the community, and does not rely on a single individual for longevity. Observations of School 3, where circus education and equipment are primarily maintained by the PE teacher, indicate that if the teacher leaves the program will also end.

Although there is a general document that standardizes basic education in Brazil, which allows the teaching of the circus in schools (Brasil, 2018), the decision to implement or not happens in the scope of each of the schools, generally meeting the individual demand of teachers. The State of Paraná (South Region) and the city of São Paulo, the largest city in Brazil, can be considered exceptions as they include the circus in their official curriculum proposals (Ontañón et al., 2012).

Who Are the Teachers?

The PE teachers are central to the implementation of teaching circus in these schools, and all showed high personal motivation to teach circus. All had higher education degrees in PE which is compulsory according to the Brazilian law (LDB n° 9.394/96 art.62 Brasil, 1996). Two teachers (Schools 1 and 6) concluded higher education before the year 2000, the others between 2001 and 2010; all had more than 10 years of experience in the area. Encounters with circus arts during their PE degrees motivated teachers to include circus in PE classes, with the exception of the School 2 teacher. Some of the teachers started teaching the circus at school immediately after completing their PE undergraduate diploma (Schools 1, 3, 4, and 7). Teachers from Schools 3, 4, and 7 were responsible for starting the project in their schools.

Continuing education has been mentioned as very relevant to the teacher's training before they began teaching circus in PE. The School 2 PE teacher highlights continuing education through “juggling conventions” (where amateur and professional jugglers gather to exchange technique). General artistic education (music, theater and dance) was mentioned by School teachers 6 and 7 as complementary to circus training (School 6 teacher). Only School 2 reports offering regular circus training to the teachers as part of their pedagogical project. In general, teacher training follows different

itineraries, mostly motivated by personal interest. In the teachers' words:

I faced some challenges [...]. I started at [name of university], and doing some searches by myself [in courses, study groups, ...] that helped a lot in my pedagogical practice [...]. I had some difficulties. I tried a little bit of each thing [circus disciplines], and this practice teach me a lot. I use all this experience with the students, bringing exactly what I learned (Maria-School 4 teacher).

The majority (06) of the teachers reported have artistic professional experience. Five of them perform in Circus Arts (Schools 1, 2, 6, 7, and 8), one in Music and another one in Dance (School 4). Their personal experiences in performing arts informed their decisions to teach circus at school. It is clear that the unavailability of specific education for teachers who intend to teach circus in schools has led teachers to access other forms of professional training.

The overall gender of circus teachers was balanced (7 men and 6 women—Table 2). In the curricular programs students either had a male or a female teacher (Schools 3,4,5,7, and 8), however extracurricular activities (Schools 1 and 2) sometimes had more than one teacher per group. In these cases, the participation of both male and female teachers was deliberately chosen by the schools. In this specific aspect it was possible to notice that the teaching conditions between the curricular and extracurricular activities are quite different. Both teachers and administrators reinforce that being able to count on more than one teacher and, whenever possible combining male and female educators, facilitates the implementation of circus discipline diversity.

How Deeply Has Circus Been Integrated in Schools?

School administrators agree with teachers that financial support is crucial, but not solely responsible, for maintaining programs. The most productive form of institutional support identified by participants was the inclusion of circus in the curricula, or as a topic in PE or Arts disciplines. Lack of adequate circus equipment and qualified teachers was the most consistent problem faced by schools. In cases like Schools 3 and 5 the continuity of the programs is fragile and dependent on teachers continued engagement and motivation.

The Pedagogical Directors of most schools spoke about the importance of using an interdisciplinary approach to integrate circus within other curricular content. However, in practice, this was achieved primarily by Schools 6 and 8, indicating that interdisciplinarity is an uncommon reality. The factors that enable or prohibit integration of circus into the broader curricular content have not yet been studied.

In all schools where circus education is curricular (PE and / or Art) (3, 4, 5, 6, 7, 8), participation is mandatory for all student groups; extracurricular programs (1 and 2) are optional for students and require additional fees, which effectively functions

as a barrier to participation for many students. Circus activities are generally 1 h in length, once or twice a week in extracurricular programs during the academic year (Schools 1 and 2). In the curricular programs (3, 4, 5, 6, 7, and 8) one or two classes are held per week, lasting 50–70 min on average, and each teacher is free to establish how many classes will be held in relation to the other required PE activities. The decision depends on how teachers divide PE contents along the school year. For instance, Schools 3, 4, and 5 offer between 2 and 10 days of circus activity per year; Schools 7 and 8 hold ~35 classes per year; and School 6 schedules 72 classes per year.

Are Children Engaged? What Do they Practice? Is There Any Gender Preference? Organization by Discipline

We note that all teachers organize teaching based on different circus disciplines. All eight schools teach acrobatics (individual and group) and juggling. Balance activities are developed in most schools (only School 3 does not develop it). Aerials are taught in 5 of the schools (1, 2, 6, 7, and 8) and clown in three (2, 3, and 8). In general, we observed a set of ~20 circus disciplines (Table 2). Most schools are restricted to teaching 4 or 5 disciplines and only 2 (extracurricular) are able to offer greater diversity of subjects.

The teaching of circus subjects is strongly linked to the facilities and equipment available in each school: in Schools 1 and 6, aerial silks, aerial hoop and trapeze are available circus apparatus; in School 7, only aerial silk is developed because they do not have other aerial circus equipment. Low-resource schools tend to focus teaching on juggling and acrobatics, borrowing mattresses from gymnastics teaching or other established activities also developed in school PE. There are also some teachers who teach transversal content beyond circus disciplines, such as the history of the circus and particularly of animal tamer, as was the case in School 4.

Instructional Strategies

Among the various instructional strategies adopted by the teachers “free play” (task-based activities with some teachers guidance) was most used in all schools. The “circuit activities,” where children move between different stations with different circus disciplines in a sequential order, were also common, with the exception of Schools 2 and 3. We noticed that in some schools, circus teaching was a direct reflection of the coaches' circus abilities, becoming most evident in schools with only one teacher. The teachers' testimonies reinforce this:

Our planning seeks to cover most circus disciplines. But we end up strengthening some more than others, this is a reflection of the skills of the team itself (circus teachers) who are more in tune with some disciplines. I recognize that we leave some subjects in the background, due to our own weaknesses. Teachers have limited skills (Eric-School 1 teacher).

We mainly teach juggling and aerials, because that's what we know best. We also teach some clown games and a little bit of balance (Linda-School 2 teacher).

TABLE 2 | Circus disciplines and gender preferences.

School	Teachers (gender)	Circus disciplines	Preference	
			Girls	Boys
1	3M/ 2F	Aerial (silks, trapeze and aerial hoop); Juggling (scarves); Balance (chinese ball <rolling globe>; rolla-bola; stilts); Acrobatics (trampoline and mini-trampoline)	Aerial (Silks and Trapeze)	Trampoline
2	1M/1F	Juggling (diabolo, devil sticks, balls, clubs and rings); Balance (unicycle and rolla-bola); Acrobatics (individual and group); Aerial (silks, trapeze and aerial hoop); Clown	Acrobatics	Juggling
3	1F	Acrobatics (individual and group), juggling (balls, diabolo and scarves); "Drama games".	No difference	No difference
4	1F	Balance (tightrope and tin-can stilts); Acrobatics (individual and group); Juggling (scarves, handmade swing poi and hat spinning); Extra: Circus history; Circus animal acts and handlers; "knife thrower" game; creation/exploration, circus acts training, rehearsal and performance.	No difference	No difference
5	1F	Balance (stilts and rolla-bola); juggling (balls and diabolo); Acrobatics (individual and group)	Individual acrobatics	Stilts and Rolla-bola
6	1M	Balance (rolla-bola, chinese ball); Acrobatics; Juggling (balls, Chinese/Spinning plates, diabolo); Aerials (silks, trapeze and aerial hoop).	Aerial (silks and trapeze)	Acrobatics (trampette) and Rolla-bola
7	1M	Balance (stilts and rolla-bola); Acrobatics (individual floor skills); Aerials (silks); Juggling (Chinese plates; hat spinning; rings).	No difference	No difference
8	1M	Juggling; Balance (stilts and rolla-bola); Drama games/Clown; Acrobatics (individual and group); Aerials (silks and trapeze).	Aerial (silks and trapeze)	Juggling

Student Engagement, Gendered Engagement

Our observations showed a high level of student participation in activities, and very few non-motivated children. Teachers and managers spoke enthusiastically about the results, reinforcing this perception. When we closely observe participation school by school, we can compare student preferences of circus disciplines by gender against the disciplines being taught, which reveals participation patterns (Table 2).

In the three schools (3, 4, and 7) with the youngest children (grades 1–5), no gender preference was observed. However, we see some trends in the other five schools (1, 2, 5, 6, and 8). In some groups, mainly from the 6th grade and older, we noticed that students self-divided by gender, both in classes based on "free play" and "circuit activities."

Girls showed greater interest in the aerial activities, specifically in the practice of silks and trapeze (1, 6, and 8); in two other schools girls preferred individual acrobatics (2 and 5).

Boys show greater interest in acrobatics (trampoline and mini trampoline) in Schools 1 and 6, and preferred juggling in two other schools (2 and 8) (Table 2). Some teachers have acknowledged concern about these trends, indicating that they seek to balance student participation in all disciplines in the same way. At School 2, we observed some classes in which the group of students was divided by gender, so that each group could participate in activities guided by different teachers. In the teacher's own words:

Boys like to juggle and girls like acrobatics. When we divide, boys spend 40 min juggling with the male teacher and 20 min with the female teacher in acrobatics; and then change. So the children experience both teachers and we respect the disciplines that they most identify with in order not to demotivate (Thomas–School 2 teacher).

The multiple case studies that compose this project showed a recurrent concern among teachers in developing gender equality in their pedagogical practices (Uchoga and Altmann, 2016). Teachers were wary about replicating traditional sport models, which literature shows mostly engage boys (Penney, 2002; Garrett, 2004, 2006).

DISCUSSION

Circus Arts in PE

The implementation process of teaching circus in the schools of this study coincides with a period when engagement with circus arts in Brazil was rapidly increasing, beginning in the late 1990s and consolidating in 2005 (Ontañón et al., 2012). During this period, we also noticed an increase in the literature dealing with teaching circus at school in Brazil, which may have empowered more teachers to venture into this area (Faria et al., 2010; Miranda and Bortoleto, 2018).

In agreement with the literature studied, teachers indicated that popularization of teaching circus in school PE seems to be associated with the search for an alternative to sport-based models, which have been hegemonic in Brazil since the 1980s.

Something similar was observed by Garcia (2013) in France, where circus has been a longstanding option within PE classes: because most PE teachers come from a sport background, many prefer to teach highly athletic circus activities with an artistic component than the required dance practices. Perhaps drawing from its French roots, circus has been implemented in some Canadian schools as well (Froissart and Thomas, 2019). Price (2012) argues that the search for innovative practices in New Zealand PE has led to the inclusion of circus. We see PE as one of the main “entrance doors” for teaching circus at school in Brazil (Takamori et al., 2010), something also noticed abroad (Tribalat, 2003; Bolton, 2004; Coasne, 2013; Kriellaars et al., 2019). It is important to note that two of our observed schools teach circus as an extracurricular activity, which also introduces circus into the school environment, albeit differently. Teaching circus in PE curricular programs is not the only possibility, as suggested by Nevanen et al. (2014), reinforcing that teaching circus arts at school could combine different programs and professionals (PE teachers, Art teachers, etc.).

Supporting Circus Activities

Participants indicated that teacher education in circus art was an important element in achieving good program results. The PE teachers testimonies indicated a positive relationship between what they have learned in undergraduate education with what they already do at school, which is already highlighted in Brazilian literature (Miranda and Bortoleto, 2018) confirming how important it is to have exposure to circus in Physical Education Teaching Education–PETE (Tucunduva and Bortoleto, 2019). The participation of teachers in continuing education was decisive for most of them becoming comfortable with teaching circus, as well suggested by Kriellaars et al. (2019). Artistic experiences, especially in the specific field of circus, seem to contribute significantly to an educator’s motivation to teach circus (Takamori et al., 2010; Garcia, 2013).

We noticed that most of the programs were started through teacher initiatives and, often, with equipment they provided. Managers and teachers were emphatic that institutional support, good facilities and the purchase of appropriate equipment contribute decisively to the success of the programs. For this reason, public school teachers showed greater difficulty in consolidating their projects. Contrary to Ward’s observation that circus programs are usually left to fend for themselves (2001), the cases studied in Brazil show adequate support from the school managers. Positive results from institutional support allowed most schools to expand their programs (especially Schools 1, 2, 6, and 8).

Effects of Teaching Strategies

With regard to teaching strategies, the “free play” option has been one of the most used, which does not come as a surprise in art teaching since is based in a non-regulated exploration and can contribute to students’ social, cognitive and emotional development (Burdette and Whitaker, 2005). Some of the social aspects involved in this strategy are autonomy, problem solving, socialization, and coexistence (Aras, 2016). These aspects are linked to the students’ free choices (Wood, 2014) and culminates in reproducing their preferences. Previous studies in Brazilian schools (Takamori et al., 2010; Ontañón et al., 2012), show similar experiences in other schools, with positive results.

In general, circus activities at school showed high participation of all children, regardless of gender, which is already encouraging as a means of maintaining physical engagement in youth. Furthermore, because circus is a performing art, in which girls tend to participate more readily than boys Garcia (2007), it shows that moving away from a competitive model does not reduce male physical engagement. The circus as a novelty for PE seems to stimulate the high participation rate (Price, 2012). In all schools, circus has been taught with mixed-gender groups, which is crucial for minimizing gender differences, as suggested by Hills and Croston (2012).

Gendered Preferences

Student preferences for different circus activities are influenced by gender relations, and possibly by the action-conscious or not-of the teachers (Funk, 2018). Historical pressures and trends have led to the “gendering” of certain disciplines in performance, which students and educators see in circus shows, technique videos, etc. (Harrison, 2019). The gender preferences of participants in these programs was also associated with classical “gendering” of circus disciplines and in some schools based on the preferences of their teachers. This study indicates that although a strong pedagogical option, “free play” can, in some age groups, reinforce students grouping together by gender. In this sense, “free play” activities can reproduce gender preferences, especially based on teachers’ preferences (Garcia, 2007) and, therefore, require attention and monitoring by teachers. For this reason, “circuit activities” contributed more sustainably to reducing gender asymmetry while still maintaining high participation and building student autonomy and responsibility (Coasne, 2013). Our findings reinforce Kriellaars et al. (2019)’s observation that participation in circus engages students of all

genders in grade 5. Gendered activity differences began to appear in grade 6 and up, indicating that external socializing forces may also be affecting student preferences.

Some teachers reported that they had not noticed gender preferences, however others indicated that some differences had been noticed with respect to the practice of the different circus disciplines. Some schools have even taken actions to minimize the tendency of students to gravitate toward certain activities with respect to their gender, especially in teaching strategies. It is important to note that the Brazilian Curricular guidelines reinforce that there should be no gender distinction and that the inequality should be fought (Brasil, 2018). However, there are still huge differences in the field of school PE in Brazil (Uchoga and Altmann, 2016) which requires permanent attention. Thus, circus education emerges as an important option for a PE that is still unbalanced with regard to gender (Garrett, 2004; Ontañón et al., 2013). Therefore, when we assume gender as a social construct (Bourdieu and Wacquant, 1992), both participation in PE and, more specifically, in circus instructions, seem to be linked to the context.

CONCLUSIONS

In a multiple-case study, we strive to understand each case as unique and a product of its particular context, thereby resisting comparisons between specificities. Even so, patterns emerge from each site which can be discussed together. In all schools we observe high participation of children in circus education across all age groups, contrasting many studies that show the drop in children's interest in PE at school as they age, mainly after grades 7/8 (Silva et al., 2019). When we look at student engagement in more detail, our observations show that instructional design is directly related to participation. "Free play" and "circuit activities" were the most motivating strategies. It is possible that the greater diversity of circus disciplines taught through these methods contributed to maintaining children's interest, however, considering gender issues, it requires permanent attention by the teachers.

In schools with younger children there were no noticeable differences in gender preferences for certain circus disciplines, but older students showed strong preferences along gender divisions. For this reason, we recommend that schools monitor gender tendencies, as well as the provision of continuing education to teachers so that they expand their skills for teaching other circus disciplines. Well-trained teachers are crucial to the quality of teaching and are more able to offer a diversity of pedagogical strategies to maintain participation and gender equality, as well as being familiar with a broader diversity of circus disciplines.

These measures seem necessary so as to avoid an association between gender and intrinsic characteristics of circus practices;

children should see circus as a combination of their interests reinforced by the actions of teachers. Therefore, we agree with Quennerstedt (2019) that the PE can effectively contribute to a more equal gender participation in physical activities, and our research shows that circus instruction within school contexts offers many opportunities to promote gender equity.

This study is limited with regard to the geographic location of schools. Therefore, we intend to expand the sample, including schools from other states and regions of Brazil in future studies.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

ETHICS STATEMENT

The studies involving human participants were reviewed and approved by Research Ethics Council, University of Campinas. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

MB: research project coordination (all case studies), general data analysis review, and full paper writing (intro, method, results—tables, discussion, conclusion). TO: case 7 and 8 study, specific and cross cases data analysis, and article writing (intro and method). LC: case 5 and 6 study, specific and cross cases data analysis, full paper writing, and article writing (results and discussions). AF: general data analysis and discussions writing, all article language review, and article writing (results and discussions). CM: case 1 and 2 study, specific and cross cases data analysis, and article writing (intro and conclusion). GS: case 3 and 4 study, specific and cross cases data analysis, and article writing (method and discussions). All authors contributed to the article and approved the submitted version.

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Gender Stereotypes in Student Evaluations of Teaching

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This paper tests how gender stereotypes may result in biased student evaluations of teaching (SET). We thereby contribute to an ongoing discussion about the validity and use of SET in academia. According to social psychological theory, gender biases in SET may occur because of a lack of fit between gender stereotypes, and the professional roles individuals engage in. A lack of fit often leads to more negative evaluations. Given that the role as a lecturer is associated with masculinity, women might suffer from biased SET because gender stereotypes indicate that they do not fit with this role. In two 2 × 2 between groups online experiments (N 's = 400 and 452), participants read about a fictitious woman or man lecturer, described in terms of stereotypically feminine or masculine behavior, and evaluated the lecturer on different SET outcomes. Results showed that women lecturers were not disfavored in general, but that described feminine or masculine behaviors led to gendered evaluations of the lecturer. The results were especially pronounced in Experiment 2 where a lecturer described as displaying feminine behaviors was expected to also be more approachable, was better liked and the students rather attended their course. However, a lecturer displaying masculine behaviors were instead perceived as being more competent, a better pedagogue and leader. Gender incongruent behavior was therefore not sanctioned by lower SET. The results still support that SET should not be used as sole indicators of pedagogic ability of a lecturer for promotion and hiring decisions because they may be gender-biased.

Keywords: student evaluations of teaching (SET), gender stereotypes, gender bias, social psychology, experiment

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INTRODUCTION

The purpose of this article was to test the impact of gender stereotypes in student evaluations of teaching (SET), in two online social psychological experiments. Previous research in this field indicates a gender bias in SET where women generally receive lower SET compared to men (e.g., MacNeill et al., 2015; Boring, 2016; Mengel et al., 2018; Mitchell and Martin, 2018; Fan et al., 2019). With this article, we contribute to an ongoing discussion about the use of SET, both as formative and summative evaluations of teaching and teachers. We provide new insights into the mechanisms behind SET and how they relate to a lecturer's gender identity and gendered behavior.

Taking a social psychological perspective, gender biases may occur because gender stereotypes prescribe and proscribe certain behaviors for individuals of different genders. Specifically, when gender stereotypes and professional roles do not fit, the individual can be sanctioned with negative evaluations (Heilman, 2001; Heilman and Chen, 2005; Heilman and Haynes, 2005). In this article, we test to what extent women lecturers in higher education are sanctioned by low SET due to a tradeoff between behaviors expected from the supposedly masculine-coded role as a university lecturer, and the stereotypes about how women should and should not be.

Student Evaluations of Teaching

Originally, SET were introduced for formative purposes. That is, the evaluations were to be used in order to improve and shape the quality of teaching (Hornstein, 2016). Since then, SET has become a primary indicator of summative evaluations of a lecturer's performance. That is, SET are used as an overall sum of pedagogical competence, often as the sole indicator of this competence (Berk, 2005; Galbraith et al., 2012; Spooren et al., 2013). SET are now often used for promotion and hiring decisions (Cashin, 1999; Seldin, 1999; Clayson, 2009; Davis, 2009; Seldin et al., 2010), indicating that it is important to understand systematic variations in SET.

SET were first criticized by Adams (1997), where he pointed out several flaws such as validity, reliability, gender bias, and a number of other related issues (Yunker and Yunker, 2003; Wright, 2006; Beecham, 2009; Hofer et al., 2012; Spooren et al., 2013; Braga et al., 2014; Stark and Freishtat, 2014; Boring et al., 2016). It is suggested that SET mainly reflects satisfaction with teaching among students after they have finished a course. As such, it is argued that SET rather should be seen as a popularity measurement, rather than a measurement of teaching capability (Beecham, 2009; Spooren et al., 2013; Braga et al., 2014; Stark and Freishtat, 2014). This paves the way for both individual and contextual factors to exert influence regarding high or low evaluations and leads to the aim of the present article—to test if gender stereotypes influence SET.

Several studies have shown a gender bias in SET, although the results are inconclusive. Many studies have shown that women receive lower evaluations than men (MacNell et al., 2015; Boring et al., 2016; Mengel et al., 2018; Mitchell and Martin, 2018). For instance, Boring et al. (2016) showed a systematic gender bias in SET where women lecturers received lower evaluations on seemingly objective aspects, such as how promptly assignments were graded. Likewise, Mitchell and Martin (2018) showed that a woman lecturer was rated lower on other similar aspects, such as the course itself, work load, the technology, etc. However, some studies show that women receive higher ratings than men (Rowden and Carlson, 1996; Bachen et al., 1999), and finally, some have not found a difference between evaluations of women and men (Feldman, 1993; Centra and Gaubatz, 2000). These results imply that gender of a lecturer alone is not sufficient to explain variations in SET between women and men lecturers. One possible cause to the inconsistencies in earlier results may be that both individual and contextual factors interact with a lecturer's gender (Boring et al., 2016). For instance, Boring et al. (2016) found that the gender bias in SET varied with, for example, discipline. These results are supported by Mengel et al. (2018), who showed that the gender bias is magnified in mathematical courses, and particularly pronounced for younger women lecturers. One explanation might be that the STEM-field (Science, Technology, Engineering, and Math) is heavily dominated by men (Makarova et al., 2019), where (younger) women accordingly violate the gender norms, resulting in a lack of fit between the expectations of their gender role and the expectations of the role as a university lecturer, which could explain the bias (Heilman, 1983, 2012). Such lack of fit, described more below, indicate that a woman lecturer behaving in a

“masculine” way may receive different SET as compared to a woman lecturer acting in a “feminine” way, which essentially decreases the lack of fit. To better understand the complexity of how gender, stereotypes and fit between a lecturer's gender and their behavior operate to influence biases in SET, we now turn to social psychological theory.

Gender Stereotypes

Gender stereotypes are collective mental representations about what is typical regarding women and men when it comes to personality, behavior, and/or expression (Ellemers, 2018). This means that gender stereotypes are shared generalizations about women and men, and the consensus of these generalizations among the population is high (Hentschel et al., 2019). The content of the gender stereotypes pertain to two core dimensions in social judgment, referred to as agency and communion (Abele and Wojciszke, 2014). Agency refers to goal-achievement, whereas communion refers to the maintenance of social relationships (Bakan, 1966). Women are more often perceived as communal (e.g., caring, sensitive, loyal, and understanding; Eagly and Wood, 2012), while men are more often perceived as agentic (e.g., independent, assertive, dominant, self-reliant, and determined). Hence, agentic traits are traditionally associated with masculinity, while communal traits are traditionally associated with femininity. Importantly, gender stereotypes function both prescriptively (what women and men should engage in, and how they should be), and proscriptively (what they should not engage in and be) (Gustafsson Sendén et al., 2019; Hentschel et al., 2019).

When gender stereotypes are fulfilled, that is, when women perform communal tasks and men perform agentic tasks, individuals are positively evaluated. Thus, lecturers who adhere to gendered expectations can be evaluated more favorably (Andersen and Miller, 1997). For example, Boring (2016) found that women lecturers received the highest ratings on availability and quality of contact—two characteristics typical of the stereotypes for women (Abele and Wojciszke, 2014). In relation to social perception and evaluation of others, the problem with stereotypes becomes evident when they are challenged—when gender and role, or behavior, mismatch. When stereotypes regarding roles or behavior and gender are incongruent (i.e., lack of fit), individuals are likely to be sanctioned and negatively evaluated (Heilman, 1983, 2012; Eagly and Karau, 2002; Heilman and Okimoto, 2007; Brescoll et al., 2010). Rudman et al. (2012) discuss a gender backlash effect where women can reach higher positions through agentic behaviors, but they are at the same time disliked and hence not viewed as hireable. This leads women to a situation where they are forced between being liked or being respected, which undermines their ability to achieve positions of power (Rudman et al., 2012). For instance, when women engage in behaviors typically considered as masculine, they are less liked and their behavior is found to be less socially accepted, as compared to when men engage in the same behavior (Bartol and Butterfield, 1976; Jago and Vroom, 1982; Carli, 1990; Carli et al., 1995; Heilman and Okimoto, 2007). This seems to be true in students' perceptions of lecturers as well. When gender roles are violated by lecturers, students become critical

(Chamberlin and Hickey, 2001; Sprague and Massoni, 2005). This suggests that if gender stereotypes are responsible for the variation in SET between women and men lecturers that has been observed in previous research, the role as a lecturer is coded as masculine. Traditionally, higher education has been exclusively for men, which could still affect how the role as a university lecturer is perceived in terms of gender. Moreover, being a lecturer at a higher education institution is a leadership role, and because leadership and authority traditionally are associated with masculinity (see Heilman and Okimoto, 2007), women lecturers violate gender stereotypes and may face biases and criticism (Eagly and Karau, 2002). Hence, women lecturers must balance the demands of their gender role, as well as the demands of being an authority figure, which inevitably will lead to some sort of discrepancy. Taken together, theory and empirical studies highlight the difficulty that women lecturers have in balancing the tension between agentic demands from the leadership role and communal demands from the gender role (Zhen et al., 2018).

Overview of the Present Research

The present research zooms in on the discrepancy between gender stereotypes and the role as a university lecturer as a source of gender bias in SET. Specifically, we test if women lecturers are sanctioned if they do not engage in traditionally feminine behaviors, or lack traditionally feminine characteristics (Rudman, 1998; Rudman and Glick, 2001). The following hypotheses are formulated:

H1: Women lecturers receive lower SET on average, compared to men lecturers.

H2: A woman lecturer described as having traditionally masculine behavior and characteristics, receive the lowest SET.

In two experiments, students were presented with a description of a fictive lecturer. The descriptions varied with respect to the lecturer's gender (the lecturer was referred to as either "she" or "he" in the text). Moreover, the behavior and characteristics of the lecturer were described as either stereotypically feminine or stereotypically masculine. In Experiment 1, the description of the lecturer contained both positive and negative feminine/masculine behaviors and traits. In Experiment 2, the valence of feminine/masculine behaviors and traits (i.e., positive and negative) was even more balanced. Participants' task was to rate the lecturer on common SET items. Experiment 1 used a wide range of SET items, mainly from previous literature. In Experiment 2, the number of items were reduced due to semantical overlap.

The studies were carried out in accordance with the national guidelines on ethical research established by the Swedish Research Council retrievable at: <https://publikationer.vr.se/en/product/good-research-practice/>.

EXPERIMENT 1

Because our hypotheses are formulated to test the potential mismatch between the role as a university lecturer, and the female gender role, we first established that the role as a university lecturer was indeed coded as masculine. In a pilot study, 82 students read a description of a lecturer. The description varied

with respect to gender stereotypical (feminine and masculine) characteristics and behaviors of the lecturer, but no actual gender information was provided (i.e., we replaced the pronoun with X). After reading the description of the lecturer, participants indicated what gender they thought the lecturer had, as a free-text response. Across the feminine ($n = 33$) and masculine ($n = 49$) conditions, 74 (90%) participants indicated that the lecturer was a man, only 8 (10%) indicated a woman (masculine condition: man = 44, woman = 5; feminine condition: man = 30, woman = 3). No other genders were suggested. Hence, the role as university lecturer is clearly associated with masculinity.

Method

Participants, Design, and Procedure

Four hundred US students, who were currently enrolled in higher education, were recruited from the platform *Prolific Academic*. Participant gender was assessed by free-text (Lindqvist et al., 2020); the sample consisted of 196 men (49%), 185 women (46%), 21 participants (5%) gave another response than woman/man.¹ Mean age was 27 years old (range: 18–63, $SD = 8.26$).

To assess the impact of lack of fit between the lecturer role and gender role, we designed an experiment where the lecturer's gender and behavior varied between conditions. The design was a 2 (gender: she/he) \times 2 (behavior: feminine/masculine), between groups factorial design. For example, in the feminine version, the lecturer was described as supportive and caring, being available for students, being responsive and empathic, while the masculine version was described as more focused on the research, being assertive and demanding, expecting hard work, and being unavailable. The descriptions were balanced in that the feminine version also contained some negative feminine traits, such as being uncertain, whereas the masculine version contained some positive masculine traits, such as being certain. The descriptions are provided in the **Supplementary Material**. Participants were randomly assigned to one of the four conditions (n 's = she/masculine = 119, she/feminine = 89, he/masculine = 99, he/feminine = 94).

Measures

To measure SET, a range of measures from previous research were included. The Professor Effectiveness scale (Goebel and Cashen, 1979; Wilson et al., 2014), The Brief Professor-Student Rapport Scale (Ryan and Wilson, 2014) with two sub-scales (Perceptions of the teacher and Student Engagement). Personal characteristics of the lecturer were assessed by items suggested by MacNell et al. (2015) and Boring (2016). To assess perceptions of the lecturer's competence, we included items referring to more general perceptions of the course and the pedagogy, since these may better reflect competence compared to the evaluation of individual characteristics. These items were averaged into a mean index. Two items measured the difficulty level of the course, and two items measured the general impression of the course. Finally, participants rated warmth and competence (Fiske et al., 2007). Where indices were made of the scales, we averaged the items into

¹3 did not respond at all, 2 agender, 13 non-binary, 1 trans male and 2 put two-spirit.

TABLE 1 | Scales and items used in the experiments.

Scale	Items	Responses	Cronbach's α
Professor effectiveness (Goebel and Cashen, 1979; Wilson et al., 2014)	The lecturer encourages questions The lecturer expects good work The lecturer assigns too much work The lecturer is organized The lecturer can explain concepts The lecturer behaves in a friendly manner The lecturer is generally a good teacher	1 = Strongly disagree 7 = Strongly agree	Analyzed separately
The Brief Professor-Student Rapport Scale (Ryan and Wilson, 2014)	The lecturer is compassionate The lecturer is enthusiastic The lecturer is reliable The lecturer is receptive The lecturer cares about the class The lecturer encourages questions and comments from students The lecturer makes class enjoyable	1 = Strongly disagree 7 = Strongly agree	
Perceptions of the teacher			0.88
Student engagement MacNell et al. (2015)		1 = Strongly disagree 7 = Strongly agree	0.91 0.92
	The lecturer is caring The lecturer is consistent The lecturer is enthusiastic The lecturer is fair The lecturer is helpful The lecturer is knowledgeable The lecturer is professional The lecturer is prompt The lecturer is respectful The lecturer provides praise The lecturer provides feedback		
Boring (2016)		1 = insufficient, 2 = average, 3 = good and 4 = excellent	Analyzed separately
	The lecturer's preparation and organization of classes The quality of the instructional material The lecturer's ability to encourage work The lecturer's availability The quality of contact The lecturer's ability to lead the class The lecturer's ability to relate to current issues The lecturer's contribution to the students' intellectual development		
Pedagogy items		1 = Not at all, 7 = Very much	0.87
	The content of the course aligns with the learning outcomes of the course The course offers opportunities to learn and understand the content of the course Different modules of the course are integrated with each other The examinations on the course measures the learning outcomes Do you think that the students on the course have learnt much compared to what they knew before the course Do you think the requirements for the grading have been clearly communicated		
Difficulty level			Analyzed separately

(Continued)

TABLE 1 | Continued

Scale	Items	Responses	Cronbach's α
Single-items	How many hours do you think that the students at the course study	Responses were made as free text ^a	Analyzed separately
	What is the level of requirement	1 = Extremely easy 7 = Extremely difficult	
	What is your overall impression of the course	1 = Extremely bad 7 = Extremely good.	Analyzed separately
	How interested would you be in attending a course with the lecturer	1 = not at all interested, 7 = Very interested	
Fiske et al. (2007)	Warmth Competence	1 = Strongly disagree 7 = Strongly agree	

^aThis item was re-formulated in Study 2 since some participants expressed that it was difficult to understand. Perceptions of the teacher and Student engagement are subscales of The Brief Student-Rapport Scale.

a mean index. Cronbach's α 's for these scales are shown in **Table 1**, where it is also detailed if the items were analyzed separately (i.e., not included in a scale). The questions are summarized in **Table 1**.

Results

For all of the outcome measures detailed in **Table 1**, we computed 2×2 ANOVAs with gender of the lecturer (she/he) and gendered behavior (feminine/masculine) as between-participant factors. We also included participant gender as covariate. Means, standard deviations and *F*-values for the main effects are shown in **Table 2**. Only the main effects are presented, because none of the interaction effects were significant.

The first hypothesis stated that women lecturers overall should receive lower SET than men. The results showed no main effects of the lecturer's gender on any of the outcome variables, see **Table 2**. The second hypothesis stated that women lecturers described as having masculine characteristics and behavior should receive the lowest SET. This hypothesis implies that we would see interaction effects between gender of the lecturer and described behavior. However, none of the interactions were significant. Thus, the results indicate that there were no differences between how a woman lecturer was rated depending on feminine/masculine behavior, as compared to a man lecturer described with feminine/masculine behavior. This means that neither of the hypotheses were supported. Interestingly, there were significant main effects of whether the lecturer was described as having feminine or masculine characteristics on all outcome variables. The means are shown in **Table 2**. For easier overview, significant differences in favor of the feminine description are marked in bold, while differences in favor of the masculine description are marked in gray.

In sum, participants rated a feminine behavior more positively than the masculine behavior on almost all the outcome measures. The difference on many items are unsurprising since the text

in the feminine condition described a lecturer that was more involved with the students and teaching, therefore it can be expected that students would prefer a lecturer with these characteristics. For instance, in the Professor Effectiveness scale, the items *encourages questions, is organized, can explain concepts, behaves in a friendly manner, and is generally a good teacher* should receive higher values based on the text in the feminine condition. An interesting finding was that the participants expected that the masculine lecturer would *expect good work* and *assign too much work* to a higher degree compared to the feminine lecturer. Other results that are not easily explained by the descriptions of the lecturer are the items related to difficulty. The participants thought that the course had higher requirements and that students at the course studied more when the behavior of the lecturer was masculine.

Combined, the results indicate that the participants rate a lecturer described in feminine terms more positively, and they rather attend their course, compared to a lecturer described in masculine terms. However, the participants thought that the masculine behavior implied higher demands and a more difficult course, where students actually did put in more hours. These are not unambiguously negative features from a learning perspective.

Finally, the lecturer with masculine behavior was rated as less competent than the lecturer with feminine behavior. Even though the effect was smaller compared to the other effects in this study, it was significant. This was surprising since competence has been strongly associated with masculinity (Fiske et al., 2007). However, recent research show that competence is one aspect of gender stereotypes that has changed the most over the years, and that women now sometimes are perceived as more competent than men (Gustafsson Sendén et al., 2019; Eagly et al., 2020). Hence, the results are not contradicting of recent research. Also, in the masculine condition, the lecturer was described as more competent as a researcher than teacher, while the feminine behavior was described as more competent in

TABLE 2 | Means, standard deviations (in parentheses) and *F*-values from univariate ANOVAs for main effects of conditions (she/he; feminine/masculine), in Experiment 1, *N* = 400.

Outcome	Condition					
	Lecturer gender		<i>F</i>	Description		<i>F</i>
	She	He		Feminine	Masculine	
Professor effectiveness						
Encourages questions	3.88 (2.39)	4.34 (2.33)	1.65	6.25 (0.95)	2.35 (1.63)	751.39***
Expects good work	6.10 (1.00)	5.96 (0.85)	0.52	5.61 (0.94)	6.38 (0.83)	67.13***
Assigns too much work	3.87 (1.28)	3.85 (1.36)	0.28	3.17 (1.18)	4.42 (1.14)	109.38***
Is organized	5.55 (1.23)	5.47 (1.15)	0.69	5.66 (1.18)	5.39 (1.19)	4.89*
Can explain concepts	5.01 (1.70)	5.24 (1.60)	0.26	6.25 (0.93)	4.20 (1.54)	224.55***
Behaves in a friendly manner	4.60 (1.94)	4.82 (1.93)	0.01	6.33 (0.95)	3.39 (1.47)	505.21***
Is generally a good teacher	5.00 (1.73)	5.22 (1.65)	0.05	6.43 (0.79)	4.03 (1.15)	369.13***
Professor-student Rapport scale						
Perceptions of the teacher	4.95 (1.30)	5.03 (1.40)	0.40	6.16 (0.71)	4.05 (0.94)	582.12***
Student engagement	4.53 (1.68)	4.84 (1.71)	1.13	6.22 (0.72)	3.42 (1.14)	763.92***
MacNell	5.08 (1.06)	5.13 (1.12)	0.43	6.00 (0.62)	4.39 (0.83)	432.98***
Boring (scale 1–4)						
Preparation and organization	3.15 (0.82)	3.08 (0.80)	1.66	3.39 (0.63)	2.90 (0.87)	38.25***
Quality of instructional material	3.03 (0.87)	3.01 (0.83)	0.44	3.28 (0.69)	2.80 (0.91)	31.92***
Ability to encourage work	2.67 (0.97)	2.77 (1.01)	0.05	3.36 (0.72)	2.20 (0.87)	194.20***
Availability	2.57 (1.15)	2.66 (1.14)	0.04	3.52 (0.67)	1.88 (0.89)	397.82***
Quality of contact	2.48 (1.19)	2.65 (1.20)	0.27	3.53 (0.65)	1.77 (0.92)	437.75***
Ability to lead the class	2.78 (1.00)	2.90 (0.96)	0.05	3.49 (0.61)	2.31 (0.91)	202.50***
Ability to relate to current issues	2.72 (0.92)	2.69 (0.95)	1.03	3.17 (0.76)	2.33 (0.92)	91.65***
Contribution to the students' intellectual development	2.78 (1.08)	2.84 (1.02)	0.24	3.50 (0.67)	2.24 (0.96)	207.31***
Pedagogy index	5.01 (1.25)	5.05 (1.16)	0.56	5.76 (0.85)	4.44 (1.13)	160.61***
Difficulty level						
How many hours do you think the student study?	9.94 (7.61)	8.81 (6.57)	2.03	7.94 (6.43)	10.60 (7.50)	12.96***
What is the level of requirement?	5.05 (1.21)	4.85 (1.25)	1.12	4.36 (1.12)	5.44 (1.10)	87.50***
Single-items						
Overall impression of the course	4.58 (1.66)	4.63 (1.56)	1.02	5.75 (1.00)	3.67 (1.41)	265.69***
Would you like to attend a course with the lecturer	4.17 (2.22)	4.44 (2.08)	0.00	5.96 (1.16)	2.98 (1.83)	325.85***
Fiske et al., 2007						
Warmth	4.09 (1.88)	4.38 (1.96)	0.45	5.82 (1.09)	2.93 (1.39)	484.83***
Competence	5.98 (1.08)	5.91 (1.13)	0.92	6.23 (0.90)	5.70 (1.21)	23.07***

****p* < 0.001, ***p* < 0.01, **p* < 0.05.

Bold figures indicate significant differences in favor of a woman/feminine lecturer, gray highlighting indicate significant differences in favor of a masculine lecturer.

pedagogy. It is possible that this asymmetry between competence in different areas influenced the participants when they made the overall competence rating. From a student perspective, pedagogical competence should be more important in SET than research competence.

One reason for the lack of main effects of the lecturer's gender, or interactions with description of behavior and characteristics, may be that the feminine version overall was seen as more positive from a student's perspective. Hence, in a second experiment, the descriptions of the lecturer were more ambiguous, so that the feminine condition also entailed more negative feminine traits and the masculine condition entailed more positive masculine traits. We also reduced the number of outcome variables, and focused on assessments of the course that were not directly related to the individual described.

EXPERIMENT 2

Methods

Participants, Design, and Procedure

We recruited 452 US students (149 from *Prolific Academic* and 303 from *M-turk*). The participants were self-defined as 143 men (32%), 241 women (53%), 58 (15%) gave another response than woman/man.² Mean age was 25 years (range: 18–65, *SD* = 6.43).

The design was the same as in Experiment 1, that is a 2 (gender of lecturer: she/he) × 2 (description: feminine/masculine), between groups factorial design. Participants were randomly assigned to one of the four conditions (*n*'s = she/masculine = 112, she/feminine = 100, he/masculine = 122, he/feminine =

²63 did not respond at all, 1 agender, 3 non-binary, 1 trans femme.

118). As mentioned, the feminine and masculine descriptions were now more balanced with respect to valence of described traits and behaviors. For instance, the feminine description detailed that the lecturer appeared afraid of students if being criticized, and problems in the teaching team where the lecturer lacked leadership skills and confidence (Abele and Wojciszke, 2014). Because we still kept the positive aspects in the description, such as being considerate, sympathetic and caring, the description was ambivalent on purpose. The masculine description underwent the same procedure, where that the lecturer was described as confident and convincing, ambitious, competent and professional, and that these traits were applied not only to research but also to teaching. By keeping some of the negative aspects from the previous description, such as being seen as unapproachable, research focused and rigid, this description also became ambivalent on purpose.

Measures

The outcome measures assessed pedagogy and evaluations of the course, rather than traits of the lecturer. The pedagogy items formed a scale with a mean index and were the same as in Experiment 1 ($\alpha = 0.85$). The items measuring difficulty level of the course were also the same, except for the item measuring perceived amount of study hours. This time, perceived amount of study hours was assessed with a scale from $1 = \textit{Very little time}$ to $7 = \textit{Very much time}$ instead of a free-text response, to make it possible to include the item in the mean index of difficulty level, instead of analyzing it separately. We kept the item “The lecturer assigns too much work” from the Professor effectiveness scale (Goebel and Cashen, 1979; Wilson et al., 2014) as it fitted nicely with the other difficulty level items. These three items were averaged into a mean index, $\alpha = 0.70$. Also, the single items regarding overall impression of and interest in attending the course were the same as in Experiment 1. We added 2 items of general impression: What is your overall impression of the lecturer? and How does the lecturer seem to be as a leader of the teaching team? Answers ranged from $1 = \textit{Extremely bad}$ to $7 = \textit{Extremely good}$. Three items asked about specific traits and engagement: Do you think of the lecturer as a serious person? Do you think that the lecturer is knowledgeable? and Do you think that the lecturer is engaged in the teaching? Answers ranged from $1 = \textit{No, not at all}$ to $7 = \textit{Yes, definitely}$. We also kept the item measuring competence and “What is your impression that the students think of the lecturer?” Finally, we kept the questions by Boring et al. (2016) because they focused more on the lecturer’s ability than individual traits (see **Table 1**).

Results

For all outcome measures, we computed 2×2 ANOVAs with gender of the lecturer (she/he) and description (feminine/masculine) as between-participants factors. Participant gender was again included as covariate. Means, standard deviations and F -values for the main effects are shown in **Table 3**. Only the main effects are included, because none of the interaction effects were significant. For easier overview, we again marked significant differences in favor of the feminine

lecturer (or a woman lecturer) in bold, while differences in favor of the masculine lecturer is marked in gray.

Table 3, shows a general pattern where type of behavior is significant on most outcome variables. For some outcomes, gender of the lecturer (she/he) was significant.

The first hypothesis stated that women should receive lower SET on average, compared to men. In contrast to Hypothesis 1, the effects were rather in favor of the woman. For instance, the overall impression of the course was higher for the woman, and she was also rated as better at pedagogy, compared to the man. Three items in the Boring (2016) scale were also significant in favor of a woman lecturer: preparation and organization, ability to relate to current issues and contribution to the students’ intellectual development, which at least partly aligns with Boring’s results. However, it should be noted that the effects were rather weak.

The second hypothesis focused on the interaction between gender of the lecturer (she/he) and description of behavior and characteristics (feminine/masculine), where we expected that a masculine woman would be rated lowest on SET. Because no interactions were significant, H2 was not supported. Hence, the results so far are largely in line with the results found in Experiment 1. This means that gender incongruent behavior, neither for women nor men lecturers, seem to lead to lower SET.

Similar to Experiment 1, there were several main effects of description (i.e., feminine/masculine). However, in contrast to Experiment 1, the effects were not consistently in favor of the feminine behavior, which indicate that we managed to make the descriptions more ambiguous. First, the masculine behavior seemed to reflect perceptions of being a better pedagogue. The feminine behavior was seen as better when it comes to encouraging work, being available, better quality of contact and better at relating to current issues—again largely in line with Experiment 1 and Boring (2016), and also in line with a feminine gender stereotype (Abele and Wojciszke, 2014). As in Experiment 1, the masculine behavior was perceived as “tougher,” such that ratings of the lecturer described as masculine were higher on difficulty as compared to the feminine condition.

The masculine behavior was perceived as conforming to traditional male stereotypes of leadership and competence, such that the lecturer was seen as more serious, knowledgeable and competent, as well as being a better leader of the teaching team and the class. A possible reason for the shift in competence from the feminine behavior in Experiment 1 to the masculine behavior in Experiment 2 is most likely due to that the masculine description this time contained having the competence to, for instance, respond to students’ questions and being more involved in the course in general.

While the participants rated masculine behavior higher on pedagogy, leadership, and learning, they still preferred the lecturer with the feminine behavior. The feminine behavior was rated higher on overall impression, and engagement in teaching. The students rated feminine behavior as more liked, and they expressed more interest in attending a course with a lecturer acting more feminine rather than masculine. Other stereotypically feminine characteristics that was rated higher in the feminine condition was ability to encourage work and

TABLE 3 | Means, standard deviations (in parentheses) and *F*-values in Study 2 (*N* = 452).

Outcome	Condition					
	Lecturer gender		<i>F</i>	Description		<i>F</i>
	She	He		Feminine	Masculine	
Pedagogy items (scale 1–7)						
Difficulty level	5.34 (0.92)	5.12 (1.01)	4.76*	5.12 (0.91)	5.33 (0.97)	3.91*
Lecturer impression						
What is your overall impression of the lecturer?	4.90 (1.23)	4.75 (1.30)	1.67	5.08 (1.15)	4.58 (1.32)	16.90***
What is your impression that the students think of the lecturer?	4.69 (1.18)	4.62 (1.21)	0.54	5.04 (1.01)	4.29 (1.25)	40.64***
To what extent do you think the lecturer is engaged in the teaching?	5.73 (1.30)	5.42 (1.48)	4.50*	5.72 (1.29)	5.42 (1.49)	4.52*
Do you think the lecturer is a serious person?	5.57 (1.49)	5.46 (1.60)	0.25	4.73 (1.57)	6.22 (1.13)	112.37***
Do think the lecturer is knowledgeable?	6.07 (1.14)	6.07 (1.13)	0.05	5.67 (1.21)	6.44 (0.91)	47.94***
How does the lecturer seem to be as a leader of the teaching team?	3.92 (1.61)	3.91 (1.62)	0.00	3.71 (1.63)	4.10 (1.62)	5.21*
Competence	5.74 (1.15)	5.53 (1.37)	2.33	5.29 (1.31)	5.94 (1.16)	24.81***
Boring (scale 1–4)						
Preparation and organization	3.01 (0.84)	2.82 (0.90)	4.27*	2.73 (0.87)	3.07 (0.85)	13.66***
Quality of instructional material	3.23 (0.67)	3.09 (0.77)	3.14	3.06 (0.73)	3.24 (0.72)	5.08*
Ability to encourage work	2.85 (0.84)	2.76 (0.87)	0.50	2.95 (0.81)	2.66 (0.88)	11.10***
Availability	3.14 (0.87)	3.14 (0.92)	0.00	3.38 (0.78)	2.92 (0.93)	28.70***
Quality of contact	2.98 (0.88)	2.89 (0.89)	1.07	3.29 (0.76)	2.60 (0.87)	71.45***
Ability to lead the class	2.72 (0.90)	2.59 (0.89)	1.77	2.42 (0.88)	2.87 (0.85)	24.11***
Ability to relate to current issues	2.80 (0.85)	2.57 (0.86)	6.99**	2.84 (0.76)	2.54 (0.93)	12.04***
Contribution to the students' intellectual development	3.02 (0.81)	2.83 (0.81)	5.35*	2.97 (0.73)	2.87 (0.89)	1.95
Single items						
Overall impression of the course	5.01 (1.15)	4.67 (1.26)	7.68**	4.93 (1.16)	4.74 (1.26)	2.89
Would you like to attend a course with the lecturer	4.53 (1.57)	4.46 (1.71)	0.31	4.83 (1.49)	4.19 (1.72)	15.13***

****p* < 0.001, ***p* < 0.01, **p* < 0.05.

Bold figures indicate significant differences in favor of a woman/feminine lecturer, gray highlighting indicate significant differences in favor of a masculine lecturer.

availability, both of which comply to a nursing, care-taking feminine gender role (Abele and Wojciszke, 2014). Finally, the masculine lecturer received higher ratings on organization and preparation.

It should, however, be noted that the feminine and masculine descriptions do not describe gender *per se*, but rather traits and behaviors associated with gender. This is interesting, because the behavior seemed to be more important than the lecturer's gender, and also more important than whether a lecturer engages in congruent or incongruent gender behavior. In short, behavior and characteristics seem to trump gender information regarding how the lecturers in our study were evaluated, however, the evaluations still follow stereotypical patterns of femininity and masculinity. Moreover, gender information and gender stereotypical behavior and characteristics sometimes seem to clash, potentially leading to a very precarious situation for lecturers in general.

DISCUSSION

Two experiments tested if the conflict between the gender role for women and the role of a university lecturer would be the reason that previous research has shown a general gender bias

in SET. Previous research shows that women often receive lower SET compared to men, but also that SET follow gendered expectations (MacNell et al., 2015; Boring et al., 2016; Mengel et al., 2018; Mitchell and Martin, 2018). This article makes several important contributions. First, we use an experiment manipulating gender congruency in behavior, second, even though our hypotheses were not supported, the results highlight new knowledge about the gendered nature of SET, and thereby also contributes to the on-going discussion about SET and their use. In two experiments, we found that evaluations of a target lecturer depended on their stereotypically gendered displayed behavior and described characteristics, and that these evaluations heavily followed gendered expectations.

Much research in social psychology shows that women and men are thought to possess different traits and characteristics that correspond to general behaviors displayed by their respective gender group on an aggregated level (Ellemers, 2018). When there is a lack of fit or incongruence between the stereotypical ideas of how someone should be or behave, in regards to gender, and the stereotypical associations to the role they hold, this incongruence may lead to biases and criticism (Heilman, 1983, 2001, 2012). The lack of fit can be driven by actual job segregation (such as in this case, where more men than women are observed

in the role of university lecturers) or stereotypical ideas that a university lecturer is a man, as we found in the pilot study. Hence, we expected that women lecturers overall would receive lower SET than men, because a lack of fit between gender stereotypes and professional role. Second, we hypothesized that a woman lecturer described as masculine in terms of behavior and characteristics would be rated lowest on SET, because of the major violation of gender norms. However, none of the hypotheses were supported.

Hence it seems that in this situation, violations of gender roles and behavior does not seem to elicit negative perceptions of the lecturer. This points to a positive development within the context of higher education since it implies that both women and men can engage in both gender stereotypical and non-stereotypical behavior without being punished (or rewarded) through SET. This means that from this study we can not say that it is an inconsistency between women lecturers' behavior that has led to the generally lower SET for women that has previously been observed (MacNell et al., 2015; Boring et al., 2016; Mengel et al., 2018). We suggest that more studies should be performed to truly establish that this is the case.

There was a fairly consistent and strong pattern that the described behavior and characteristics influenced evaluations, although not in the hypothesized direction. Instead, the feminine behavior was at large evaluated more positively, compared to the masculine behavior. Nonetheless, the pattern makes sense from a gender stereotype perspective. Overall, the ratings conformed to gender stereotypes about femininity and masculinity, even though there were some differences between the experiments. In Experiment 1, the feminine condition led to better, more positive evaluations almost across the board of questions. However, higher work load, demands and requirements were more strongly associated with the masculine behavior. These are not necessarily indicative of negativity, but are more clearly associated with a masculine stereotype of being stern, assertive, and demanding (Abele and Wojciszke, 2014). Still, the participants strongly preferred the lecturer with feminine behavior, despite the lecturer's gender. As mentioned, one reason for the overwhelmingly positive evaluations of the feminine behavior in Experiment 1, could be the asymmetric description with respect to valence where the feminine version did not include many negative aspects, while the masculine version included few positive aspects, at least from a student perspective. For instance, in the masculine condition, the lecturer was presented as a leading researcher, which is not necessarily something that the students care about. Hence, the results of Experiment 1 should be interpreted with caution.

Nevertheless, the tendencies identified in Experiment 1 were at large confirmed in Experiment 2, where the stimuli material was more ambiguous in terms of valence. Because stereotypes are heuristics in impression formation (Heilman, 2012), evaluators may rely more heavily on them when there is little or ambiguous information. The results of the second experiment were accordingly slightly different, but the general pattern showed that evaluations largely conformed to gender stereotypes. The lecturer described as masculine was perceived as a better leader, more competent, a better pedagogue, "tougher," and students expected to learn more from their course. Hence,

evaluations of the masculine behavior followed mainly from stereotypically masculine attributes such as leadership skills, competence and goal-orientation (Abele and Wojciszke, 2014). However, the feminine lecturer was perceived as being more approachable and was more liked. Moreover, and similar to the Experiment 1, participants preferred to attend the course when the lecturer was a woman. Again, these features conform to a feminine gender stereotype which is focused on the maintenance of relationships (Abele and Wojciszke, 2014).

These two experiments highlight the precarious situation that lecturers may face. While the feminine behavior increased liking, the masculine behavior increased competence ratings. Even though there were no interactions with the lecturer's gender, it is plausible to assume that this balance is more difficult for women lecturers where the likable traits and behaviors are expected, and cannot be bargained with (Heilman and Okimoto, 2007). It may be difficult for a lecturer to be rated good on both liking (or warmth) and competence, which is in line with research on gender stereotypes (Fiske et al., 2007; Heilman, 2012). Given that SET form the basis of hiring and promotion decisions (Cashin, 1999; Seldin, 1999; Clayson, 2009; Davis, 2009; Seldin et al., 2010), the results of the present research contributes to the literature.

Much of the international research on SET use questions specifically about lecturers as individuals, and their traits (Goebel and Cashin, 1979; Ryan and Wilson, 2014; Wilson et al., 2014; MacNell et al., 2015). However, whether a person is seen as compassionate or caring does not reveal information about their ability to perform as a lecturer, or about their pedagogical skills, which should be the focus of SET, regardless of how SET are to be used. Therefore, other questions should be given space, such as questions relating to the set-up of the course, the organization, the study materials etc. It is plausible to believe that such evaluations would better estimate a lecturer's pedagogical skills and abilities. However, as shown in the two experiments in this article, these judgements still obey to gendered expectations about behavior. These results line up with previous research by Boring et al. (2016) and Mitchell and Martin (2018) who found that a gender bias affected judgment of seemingly objective aspects of teaching.

Limitations and Suggestions for the Future

To our knowledge, this is the first experimental design that test gender bias in SET. The benefit of using experiments in research is also their drawback—the setting is sterile and context-free. The positive side is that the experiment allows for high control over potential confounds. In this first attempt, we aimed to have as little confounding information as possible. Hence, the stimuli material did not, for example, present what field the lecturer is active in, which is a factor previous shown to affect gender bias in SET (Boring et al., 2016; Mengel et al., 2018). This implies that the description may be too "clean" and generic, which might result in difficulties for the participants to truly engage in the described lecturer. Because the lack of substantial information to relate the lecturer to, this may lead to social desirability—that answers are colored by a desire to appear gender egalitarian. In line with this, the expected effects of the lecturer's gender were not found in any of the experiments, nor were the interactions between gender and incongruent behavior. One reason may be

that the participants were aware of gender aspects in these kinds of situations, which could lead to socially desirable answers. Indicative of this interpretation is that when the participants were asked to indicate their thoughts regarding the purpose of the study, several suggested that the study regarded gender issues. Hence, we also suspect that the gender manipulation may be more strongly influenced by social desirability compared to the behavior manipulation. Future studies may apply a more subtle way to manipulate the lecturer's gender, perhaps by using a photo of the lecturer.

There were some inconsistencies between the results found in Experiment 1 and 2, which probably were due to the non-balanced valence of the descriptions used in Experiment 1. From a student perspective, a lecturer who is engaged with the teaching, being caring and responsive should lead to higher ratings. Therefore, the results from Experiment 2 is more informative. It would be beneficial to develop the descriptions more, and for instance describe a lecturer as having both feminine and masculine behaviors. We believe this to be important knowledge for all researchers conducting this kind of text-based experiments.

Conclusions

The present study showed that behavior and characteristics seem to trump the lecturer's gender in SET, at least in this kind of relatively artificial experimental setting. This result could be interpreted as a positive outcome, since evaluations are based on behavior, rather than gender of the lecturer. Nonetheless, the evaluations of behavior follow gender stereotypes, where a lecturer described as showing masculine behavior was also seen as possessing characteristics such as competence and professionalism, whereas a lecturer described as showing feminine behavior also was seen as possessing characteristics such as being caring and nurturing. In this way, the results of this research align with social psychological theory on gender stereotypes (Eagly and Wood, 2012; Abele and Wojciszke, 2014).

However, the participants displayed somewhat contradictory responses in that they liked the caring and nurturing (i.e., the feminine) lecturer better, although they gave the masculine lecturer higher ratings on work performance. This finding is problematic, because it leaves the individual lecturer in a difficult situation. Should a lecturer focus on being professional and making sure that students actually learn, or should they be accommodating and responsive, which hence results in being liked and increases students' desire for attending the course. Therefore, these kinds of results should be communicated not only to lecturers, but also to students, so they can be aware of their own biases. The finding contributes to the ongoing discussion about the validity of SET in judging individual lecturers' pedagogical skills (Yunker and Yunker, 2003; Wright, 2006; Beecham, 2009; Hofer et al., 2012; Spooren et al., 2013; Braga et al., 2014; Stark and Freishtat, 2014; Boring et al., 2016). Given the results of the present study, there is an urge to develop reliable and valid measures of SET. To some extent, the ratings seem to fall out on two dimensions, where for instance the lecturer's availability and ability to encourage may not necessarily go along with their pedagogical skills, such as course set-up, materials, leadership etc. We therefore join the scholars before

us, and raise critical voices regarding the use of SET in their current form as the main tool for assessing lecturers' pedagogical skills and abilities, for instance regarding hiring or promotion purposes. If SET are to be used for such purposes, they should be further developed and validated to better capture actual ability of a lecturer and not reflect popularity or biases. For instance, collegial evaluations, exam results, or performance in subsequent courses could be used to validate SET, and comprise part of the evaluation of a lecturer's competence.

However, it is important to remember that SET were introduced for formative purposes, that is, to improve the teaching and student-relations (Hornstein, 2016). In that sense, SET may be better used. It is important that teachers and students share a common goal in the teaching process and that the student perspective is present when courses are developed.

We believe that two main important outcomes of this article should be highlighted. First, this is to our knowledge the first attempt to make causal inferences regarding the mechanism behind gender biases in SET, using a strict experimental paradigm. Second, we find that gender information does not seem to evoke negative evaluations of women lecturers on a general level. Moreover, gender incongruent behavior is not sanctioned by lower SET. However, students' ratings are somewhat contradictory in that they prefer a lecturer that they see as less competent and pedagogically skilled. This could leave individual lecturers in a difficult position.

DATA AVAILABILITY STATEMENT

The original contributions presented in the study are publicly available. This data can be found at the Open Science Framework: <https://osf.io/sfcym/>.

ETHICS STATEMENT

Ethical review and approval was not required for the study on human participants in accordance with the local legislation and institutional requirements. The patients/participants provided their written informed consent to participate in this study.

AUTHOR CONTRIBUTIONS

ER contributed to the general idea, first design, analyses, and manuscript drafts. MG and AL contributed to finalizing the design, continuous discussions about methods and results, and finalizing the manuscript. All authors contributed to the article and approved the submitted version.

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What Dominates the Female Class Identification? Evidence From China

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In advocating gender equality today, we should not only pay attention to women's social status but also call for the women's psychological identification of class equality. What dominates female class identification? To answer this question, based on the data of the Chinese General Social Survey (CGSS) in 2015, this study constructs a female class identity framework from five aspects: the mother's intergenerational influence, female personal characteristics, lifestyle, gender consciousness, and spouse status. In this study, the ordered logit model is used to empirically analyze the impact of various factors on female class identification, and the results show the following: (1) gender consciousness has a significant impact on female class identification. (2) Lifestyle has a significant impact on the situation of having a spouse. (3) Spouse status has a significant positive effect on female class identification. But (4) the mother's intergenerational influence has no effect on female class identification. Therefore, this paper suggests that we should improve laws and regulations to protect women's normal rights, encourage women to establish an independent and self-improvement character, and enhance the class consciousness of women, especially rural women, in order to achieve the overall improvement of female class and psychological identification.

Keywords: female class, gender equality, psychological identification, ordered logit model, China

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INTRODUCTION

Gender differences in social status have existed for a long time (Ciabattari, 2001; Mensah and Adjei, 2020; Takahashi et al., 2020). In primitive society, due to the difference in body shape and strength between men and women, men were better able to undertake the power-type labor. The distribution of housework between the husband and wife was uneven, and the status of women became increasingly lower over time (Nyman et al., 2018). Class status refers to the different social class levels, which are represented by a series of social status indicators, such as the educational level and income of the subject (Zajacova, 2006; Curtis, 2016; Zhao and Zhou, 2017). In China, since the 1990s, people have been arguing endlessly on the issues of "having a good marriage is more important than having a good job," "the ultimate significance of women is to find a good spouse to get married and nourish children," and "having a good marriage, and you can reduce 20 years of struggling." Besides, under the concept of gender inequality, women's rights and interests are difficult to be protected, which affects women's values and class identity (Weeks, 1989). Influenced by the development of market

economy background at that time, some women think that they can change their destiny by choosing to “marry successfully” instead of individual efforts, and attach their values to their spouses rather than themselves (Ye and Zhao, 2018).

In the past few decades, the proportion of women in the political institutions of almost every country in the world has increased significantly, and the trend of women’s labor force participation has also gradually increased; the social status of women has been greatly improved compared with that in the past (Fitzsimmons et al., 2014; Uunk, 2015; Wu and Zhou, 2015; Hessami and da Fonseca, 2020; Koburtay et al., 2020). Under the background of economic transformation in China, women’s social class is gradually stable in the constant changes (Chen and Ge, 2018). Recently, the education level of Chinese women has been increasing. According to the data of China Women’s Development Program (2011–2020) in 2019 released by China Statistics Bureau, the number of female postgraduate students in China reaches 1.448 million, accounting for 50.6% of all postgraduate students. This data confirms the progress of women in receiving equal education, and the importance of women’s voice in scientific research (Burt, 2019). However, has women’s identification with their own class changed? Regarding the meaning of the phrase “class identification,” through literature review, we can find that scholars agree with the views of Mr. and Mrs. Jackman (Jackman and Jackman, 1973): class identification is the individual’s perception of their own social class structure. Therefore, the existing research mainly defines “class identification” as comprising the following actions: each social member will measure or judge his social status according to his or her own conditions (such as economic strength and his own power) and will belong to a certain level of society (Anthias, 2001). The objective social status will affect the subjective class identity (Curtis, 2016). However, the improvement of the objective social status does not always involve the improvement of self-identity in the subjective sense, as there are still significant differences between them (Sakurai et al., 2010; Leicht et al., 2017; Koburtay et al., 2020). Gender inequality between men and women comprises not only the actual inequality but also the psychological inequality. In today’s advocacy of gender equality, we should not only pay attention to women’s social status but also to the appeal of women’s psychological identification with class equality, which is more conducive to social stability, health, and sustainable development (Bolzendahl and Myers, 2004; Stevens and Martell, 2019; Patterson et al., 2020).

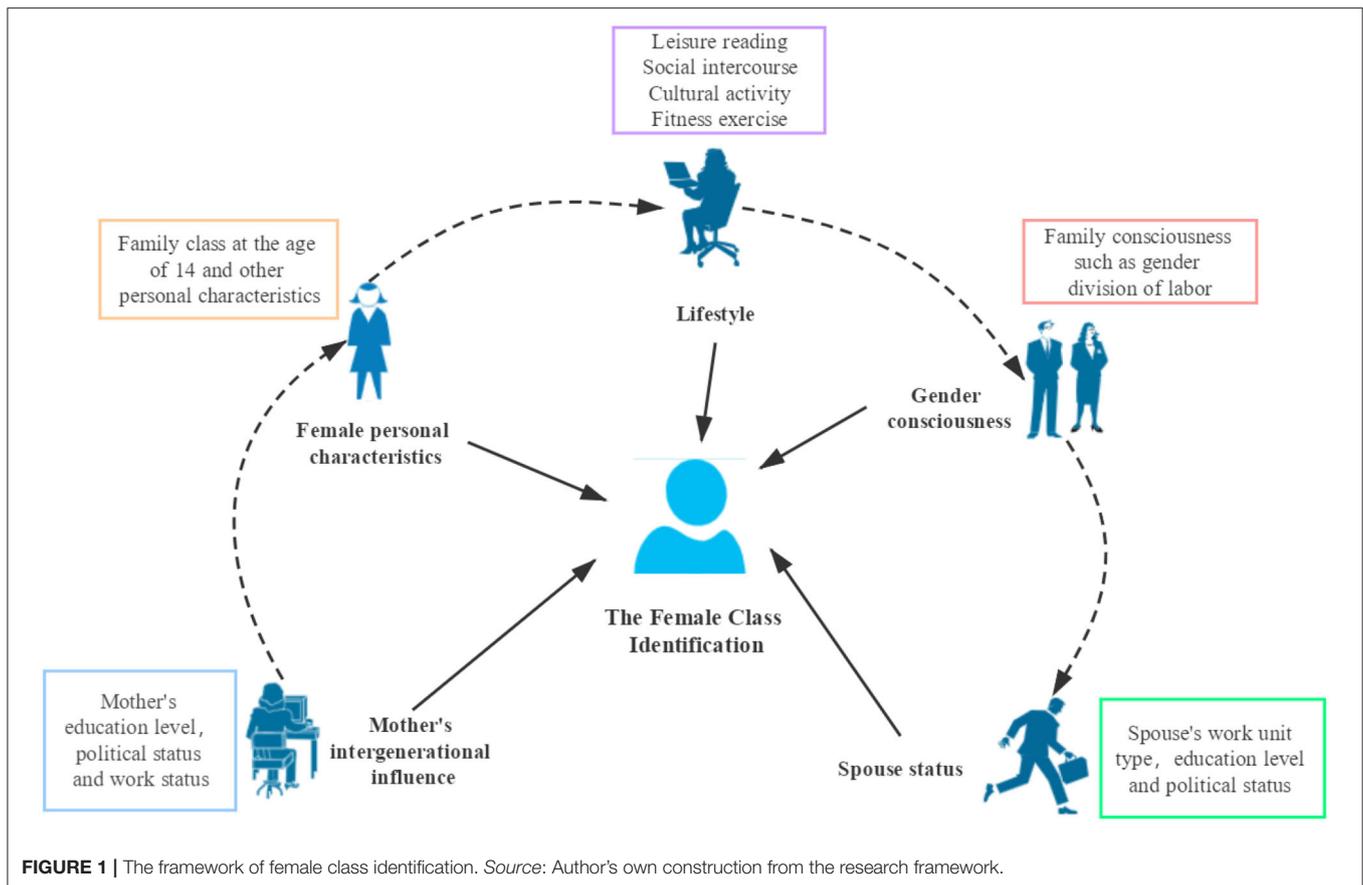
The research on class identification has been relatively extensive and has involved psychology, sociology, economics, gender research, and other research fields. Moreover, experts and scholars have different research perspectives on class identification, and the measurement standards have not been completely consistent. These scholars have mainly studied the influence of the social environment and personal characteristics on class identification (Zajacova, 2006; Sakurai et al., 2010). However, the class identification of female groups has gradually attracted attention. Female class identification not only emphasizes women’s recognition of themselves but also reflects whether women attach importance to gender equality (Bolzendahl and Myers, 2004). Some scholars pay attention to

the relationship between socioeconomic status and female class identification and believe that the higher the social status of women is, the higher their class identification is (Mendelson et al., 2008; Chen et al., 2020). There are also studies that focus on married women as the main object of study in order to analyze whether their class identification mainly comes from themselves or their spouses (Baxter, 1994; Bolzendahl and Myers, 2004). In addition, additional studies have focused on the differences between the class identification of urban and rural women. It has been found that compared with that of urban women, the sense of class identification of rural women is generally lower and that rural women are more dependent on their spouses (Beetham, 1998; Michelson, 2007; Bryant and Pini, 2009; Baylina and Rodó-Zárate, 2020). Regardless of whether the study focuses on the determination of whether married women’s class identification comes from themselves or their spouses or focuses on the differences in class identification between urban and rural women, all of these studies provide important insights for further research on the index factors influencing female class identification.

However, these studies mainly focus on one aspect of the influencing factors of female class identification, and there are few comprehensive female class identification studies that examine the topic from the perspective of the young to middle-aged personal growth experience. In particular, there are few studies on the impact of mothers on the class identification of the next generation of females and on the impact of lifestyle on female class identification. This paper creatively puts forward the female class identification framework (**Figure 1**), which mainly includes the mother’s intergenerational influence, female personal characteristics, lifestyle, gender consciousness, and spouse status. This paper summarizes some experiences that may have an important impact on women’s own class identification in the process of women’s growth and analyzes whether these factors truly affect female class identification and the degree of influence. Therefore, to provide a theoretical and practical reference for further promoting gender equality and female class identification, this study constructs an econometric ordered logit model and uses the data of the China General Social Survey (CGSS) obtained in 2015 in order to study the influencing factors of women’s class identification.

LITERATURE REVIEW

Class identification is an important research field of social development stratification (Zipp and Plutzer, 1996; Curtis, 2016; Varela et al., 2020). Many scholars have focused on the status of the objective social class in the past. Now, scholars have begun to pay attention to the differences in subjective class identification. In the past, the subjects of the study have mainly been urban residents and migrant workers, and these studies have mainly explored the impact of a series of factors, such as life experience, administrative level, the father’s professional reputation, and housing consumption, on class identification (Zhao and Ge, 2014; Wang, 2017; Rubin and Stuart, 2018; Reeves, 2019; Lee et al., 2020). Regarding the focus of the



research, which is advocacy related to pursuing equality between men and women, the current research object is mainly female groups, the analysis of which may improve to a certain degree of research significance the understanding of the class identity of female groups (Bolzendahl and Myers, 2004). Women's class identification is a kind of perception or feeling of their own position in the social class structure (Zipp and Plutzer, 1996; Rubin and Stuart, 2018). Baxter (1994) points out that the women's class perception is influenced by the state's gender openness and gender equality. This phenomenon is reflected in a series of female groups comprising rural women. The investigation and research reveals that rural women's class identification comes more from their own working conditions, the education level of their mothers and themselves, and the participation of the community, as well as the interpersonal communication with the people inside and outside the village (Michelson, 2007; Wang, 2017). Therefore, we can define the following as factors that affect women's class identification: gender consciousness, intergenerational influence of mothers, lifestyle, and spouse status.

In the family, the core unit of society, there is strict gender division in the division of labor. Generally, in terms of the family division of labor, women are mainly responsible for housework, while men are mainly responsible for going out to work (Besamusca et al., 2015; Bloom et al., 2015). In addition, most

men still hope that women can play the traditional role of a good wife and good mother, and this expectation has an important impact on women's gender consciousness (Corrigan and Konrad, 2007; Pedersen, 2016), which will also affect women's own class identification. Some studies have found that women's self class identification is greatly affected by family because women usually associate their self-worth with their husbands (Zipp and Plutzer, 1996; Peake and Harris, 2002; Zajacova, 2006; Ye and Zhao, 2018). In particular, after distinguishing between urban and rural areas, age and education level, it is found that the traditional cognition of married women on their own class status will not change significantly because they live in the city, are young and have higher education. Even when their income and education level are higher than that of their husbands, their psychological attachment to their husbands will not be fundamentally changed (Baxter, 1994). In addition, women's subordination psychology may lead them to think that their spouse's class is more important than their own. In addition, because of the failure of these women to form their own independent class identification, these women think that their spouse's class determines to a great extent their own class identification (Zipp and Plutzer, 1996; Zajacova, 2006).

Class identification is also based on the concept of mobility and network. The class identity of contemporary people will be affected by the previous generation. When the upper generation's class identification is low, then the contemporary generation's

class identification will also be low. In the process of women's growth, their mothers play an irreplaceable role in establishing the women's image and promoting class identification (Heath and Tan, 2018; Baylina and Rodó-Zárate, 2020; Kong et al., 2020). Some studies have shown that the mother's education experience, family economic level and objective class level have a significant impact on the women's perception of class mobility (Liu et al., 2013; Ziv and Arbel, 2020). With all kinds of information pouring in, individuals are no longer limited to uninteresting work and pay more attention to forms of entertainment. The members of each class show their relationship with and distance from other classes through the choice of interest (Chen et al., 2020). Taking as an example the investigation and research on the sports consumption psychology of different social classes of people, the results show that with the improvement of the social strata, the sports consumption attitude tends to be stronger (Schinke et al., 2019). When scholars take the middle class as the research object, they find that the unique taste shown in leisure tourism consumption has become the label with which individuals identify themselves, and the expression of this taste is a way for them to distinguish themselves from other people (Aramayona and García-Sánchez, 2019).

The literature review reveals that the existing literature on class identification, especially female class identification, mainly focuses on one aspect of the influencing factors. There is no comprehensive study that focuses on the four factors, namely, gender consciousness, the intergenerational influence of mothers, lifestyle, and spouse status, in order to conduct a long-term study of women's class identification. This type of comprehensive study is the innovation of this paper. Class identification is not just affected by one aspect but is constantly changing due to different experiences. It is necessary to comprehensively consider and analyze the real influencing factors of female class identification.

Therefore, to provide a certain reference for future research on female identification, this paper will use the CGSS data obtained in 2015 to study the influence of gender consciousness, mother's intergenerational influence, lifestyle, and spouse status on female class identification. Real gender equality not only exists because women can enjoy privileges but also because they can define their own class self-identification. Such recognition is not defined by anyone else or any external factors. This study is of great significance to the rise in women's status in all walks of life, and more importantly, to the pursuit of a more equal and harmonious social environment.

PROPOSED RESEARCH HYPOTHESIS

The Hypothesis Between Gender Consciousness and Female Class Identification

Gender consciousness is an important aspect of the research on gender relations and mainly includes a series of indicators (Bolzendahl and Myers, 2004; Fagertun, 2017; Nyman et al., 2018), such as the gender division of labor, the difference in ability between men and women, marriage consciousness, and gender discrimination in employment. The statistics on these indicators

are included in the CGSS data obtained in 2015. These views in the research on gender consciousness show that women agree with the low status of women in the relationship between men and women. Therefore, we propose hypothesis H1: the more women accept the view that women's status is low, the lower their sense of class identification is.

The Hypothesis Between Mother's Intergenerational Influence and Female Class Identification

In the research on family relationships, studies have found that the mother has an important influence on the daughter's family outlook and values (Liu et al., 2013; Heath and Tan, 2018; Baylina and Rodó-Zárate, 2020; Kong et al., 2020). In daily life, if the family relationship is long-term unequal, i.e., if the father is stronger and the mother is always the weaker side, this situation is likely to lead to the formation of a child's view of discrimination against women. In rural areas, for example, girls may be easily overlooked and thus have less access to education (Kong et al., 2020). As time goes on, women who have no opportunity to receive education may still neglect their daughter's education in the next generation, which leads to the lower class identification of women in the next generation. Therefore, we propose hypothesis H2: the higher the social status of the mothers is, the stronger the social identification of women.

The Hypothesis Between Lifestyle and Female Class Identification

Maslow's theory, from the lower level to higher levels, divides needs into five categories: physiological needs, security needs, social needs, respect needs, and self-realization needs (Noltmeyer et al., 2012). When individuals can basically meet their own survival needs, they will pursue higher-level needs. The higher the level of the residents' need is, the more likely it is that the residents' life is not limited to work, and the more they enjoy life (Kulich et al., 2017; van Breen et al., 2017; Rubin and Stuart, 2018). In contrast, after satisfying our basic postnatal tastes, individuals will have a better sense of happiness. As the residents satisfy their needs at one level, does the residents' class identification also improve at the same time? Therefore, we propose hypothesis H3: Among women, the higher their taste of life is, the higher their class identification is.

The Hypothesis Between Spouse Status and Female Class Identification

In the division of the class identification in the husband and wife relationship, one kind of relationship is a "dependent type," that is, one in which the female completely relies on the spouse to determine her own class (Pedersen, 2016). It is undeniable that whether a woman is married or not has a great influence on her life state. After marriage, women are more likely to devote their energy to their families, and the quality of the spouse's class will also affect women's class identification. More importantly, in reality, the way in which the work unit of a female's spouse is viewed may determine the spouse's degree of recognition in the society, thus affecting women's social

identification. Therefore, we propose hypothesis H4: Among married women, the better the spouse's work unit is, the higher the female's class identification is.

DATA SOURCE AND VARIABLE SETTING

Data

The data used in this study were obtained from the Chinese General Social Survey (CGSS, data sources: <http://cgss.ruc.edu.cn>) carried out in 2015 and sponsored by the China Social Science Foundation. The data were originally collected by Renmin University of China and Academic Institutions in China (Wang et al., 2020). By screening the control variables and eliminating the invalid questionnaires, 4,702 valid female samples were obtained.

Variable Setting

In this study, all variables are divided into explained variables, explanatory variables, and control variables. To facilitate reading and checking, the code of each variable is consistent with that in the CGSS2015 questionnaire. Through sorting, the basic information of each variable is shown in **Table 1**.

Explained Variables

The explained variables mainly reflect the female's class identification, that is, the response to the following question in the CGSS2015 questionnaire: "What level do you think you are currently at?" To respond to this question, in the questionnaire, the respondents are presented a total of 10 options: a response with a value of 1 indicates the bottom level, and a value of 10 indicates the top level; the numbers in the middle increase as the level increases. The higher the number for the response is, the higher the class the women think they belong to is, and a higher number also indicates that they attach more importance to and recognize their social status. To refine and stratify the explained variables, the responses in which participants selected options 1–3 are grouped into the lower class and are assigned a value of 1; responses of 4–7 are grouped into the middle class and assigned a value of 2; responses of 8–10 are grouped into the upper class and assigned a value of 3. Through statistical analysis, the average value of female class identification is found to be 1.749, and the standard deviation is 0.485, which indicates that most women's class identification is lower than the middle class.

Explanatory Variables

The explanatory variables are divided into four aspects: gender consciousness, the mother's intergenerational influence, lifestyle, and spouse status influence.

(1) Gender consciousness. In the CGSS2015 questionnaire, there are five items about gender consciousness. The conceptual focus of each of the five items and the corresponding item text are as follows: gender division of labor consciousness, represented by the statement "Do you agree that men focus on career, women focus on family?" Gender ability consciousness, represented by the statement "Do you agree that male ability is naturally stronger than female ability?" Marriage consciousness, represented by the statement "Do you agree that having a

good marriage is more important than having a good job?" Gender discrimination in employment, represented by the statement "Do you agree that female employees should be fired first in an economic downturn?" And housework distribution consciousness, represented by the statement "Do you agree that husband and wife should share the housework equally?" All these items reflect women's views on gender equality. For example, if women agree with the idea that "men's natural abilities are stronger than women," they may feel inferior and dare not fight for their due rights, and even be less able to correctly recognize their social class (Tian et al., 2007). The participants are asked to respond to the above questionnaire items by answering as follows: if the respondents totally disagree, relatively disagree, are indifferent to agreeing, relatively agree, or fully agree with the item statement, they respond by assigning a value of 1, 2, 3, 4, or 5, respectively. The average values for the gender division of labor consciousness, marriage consciousness, and housework distribution consciousness were between 3 and 4, indicating that these three concepts were relatively neutral among female investigators. However, the average value of gender ability consciousness was 2.934, and the average value of gender discrimination in employment was 1.818, which indicates that most women do not agree with the view that "men are born with strong ability" and "women are discriminated against in employment."

(2) Mother's intergenerational influence. If the mother has always been in a low position in the family or the mother's self-experience has intentionally or unintentionally set up a low female image for the children (especially the daughter), it will affect the class identification of the next generation. Class identification is closely related to education, political status, and work unit. Therefore, in the CGSS2015 questionnaire, three items focusing on the mother's intergenerational influence are included, namely, "What is the highest education level of the mother?" "What is the political status of the mother?" and "What is the employment status of the mother at the age of 14?" These three items represent the main background of the previous mother's generation. Significantly the mother's employment status may affect the family's income and even the status in children's hearts, and indirectly affect the shaping of children's female class identity values. For the mother's highest education level, the response values are assigned as follows: no education is assigned a value of 0; private school and primary school education are assigned a value of 1; junior high school education is assigned a value of 2; vocational high school, senior high school, secondary school, and technical school education are assigned a value of 3; undergraduate and specialty college education are assigned a value of 4; and postgraduate education and above are assigned a value of 5. According to the data statistics, the average of the highest education level of the mothers is 0.595, which indicates that the mother's education level is mainly primary school or no education. According to the calculation of the time, the period in which the mothers received education was mainly from 1950 to 1980, which was a period in which education was not popularized. The survey results confirm this fact regarding the unpopularity of education during that period as being basically true. For the political

TABLE 1 | Assignment and descriptive statistics of the variables. Source: Author's own elaboration from the CGSS2015 dataset.

Variable type	Indexes	Assignment	Average value	Standard deviation	
Explained variables	Female class identification (a431)	Lower class = 1; middle class = 2; upper class = 3	1.749	0.485	
Explanatory variables	<i>Gender consciousness</i>				
	Gender division of labor consciousness (a421)	In total, disagree = 1; fully agree = 5 (increase in order)	3.294	1.484	
	Gender ability consciousness (a422)	In total, disagree = 1; fully agree = 5 (increase in order)	2.934	1.521	
	Marriage consciousness (a423)	In total, disagree = 1; fully agree = 5 (increase in order)	3.070	1.641	
	Gender discrimination in employment (a424)	In total, disagree = 1; fully agree = 5 (increase in order)	1.818	2.147	
	Housework distribution consciousness (a425)	In total, disagree = 1; fully agree = 5 (increase in order)	3.787	1.388	
	<i>Mother's intergenerational influence</i>				
	Mother's education level (a90b)	None = 0; primary school = 1; junior high school = 2; senior high school = 3; undergraduate = 4; postgraduate = 5	0.595	0.915	
	Mother's political status (a90c)	Party member = 1; other = 0	0.017	0.130	
	Mother's work status (a90d)	None = 0; agricultural = 1; non-agricultural = 2	0.886	0.381	
	<i>Lifestyle</i>				
	Leisure reading (a3005)	Never = 0; several times a month = 1; several times a day and a week = 2	0.141	0.443	
	Social intercourse (a3007)	Never = 0; several times a month = 1; several times a day and a week = 2	0.488	0.705	
	Cultural activity (a3012)	Never = 0; several times a month = 1; several times a day and a week = 2	0.679	0.923	
	Fitness exercise (a3009)	Never = 0; several times a month = 1; several times a day and a week = 2	0.603	0.851	
	<i>Spouse status</i>				
	Spouse's work unit type (a87)	Social organizations or no work = 1; other = 2	1.593	0.491	
	Spouse's education level (a72)	None = 0; primary school = 1; junior high school = 2; senior high school = 3; undergraduate = 4; postgraduate = 5	1.966	1.160	
	Spouse's political status (a73)	Party member = 1; other = 0	0.126	0.332	
	Control variables	Female age	Actual age at the time of the investigation = 2015-a301	50.018	16.702
Female political status (a10)		Party member = 1; other = 0	0.045	0.208	
Female marital status (a69)		Unmarried = 0; other = 1	0.928	0.258	
Female education level (a7a)		None = 0; primary school = 1; junior high school = 2; senior high school = 3; undergraduate = 4; postgraduate = 5	1.702	1.305	
Female work status (a58)		None = 0; agricultural = 1; non-agricultural = 2	0.806	0.861	
Female household registration type (a18)		Agricultural = 1; non-agricultural = 2	1.312	0.464	
Female sense of social equity (a35)		Completely unfair = 1; completely fair = 5 (increase in order)	3.194	0.995	
Housing property rights (a121)		Owned = 1; other = 0	0.358	0.479	
Female family economic class (a64)		Well below average = 1; well above average = 5 (increase in order)	2.622	0.702	
Female family class at 14 years of age (a434)		Lower class = 1; middle class = 2; upper class = 3	1.381	0.527	

In this table, the code in brackets below each index represents its corresponding question number in CGSS2015.

status of mothers, the "Party member" response is set to 1, and the others are set to 0: the average response value is 0.017, indicating that the majority of mothers are not party members. Through statistical data, it is found that the number of female respondents whose mothers are not party members is 4096. The employment status of mothers at the age of 14 will also

affect the employment identification of the next generation. The value of no job is assigned as 0, that of agricultural work is assigned as 1 and that of non-agricultural work is assigned as 2. The average value of this index is 0.886, which indicates that most of the mothers of the women surveyed are engaged in agricultural work.

(3) Lifestyle. In the questionnaire of CGSS2015, four items are selected to represent the four aspects of lifestyle: the frequency of leisure reading, social intercourse, cultural activities, and fitness exercises, because now people pay more attention to the quality of life than before. If they carry out fitness exercises, social intercourse, and other activities, it also proves that their quality of life has increased, and the objective social class has improved (Chen and Lin, 2016). The subjective social class identity will be affected by the objective social class, so the lifestyle affects the objective social class, affecting the subjective social class identity. The answers to the questions for these items are as follows: every day, several times a week, several times a month, several times a year or less, and never, which are assigned a value of 1, 2, 3, 4, and 5, respectively. For the convenience of statistics, since “never” and “several times a year or less” mean that they have little impact on life, these responses are assigned a value of 0; “several times a month” is assigned a value of 1; and “several times a week” is assigned a value of 2. The leisure reading factor was represented by “participating in cultural activities, such as listening to concerts, watching performances, and exhibitions;” the respondents answers had an average value of 0.141, indicating that most women hardly have time to engage in leisure reading. The social factor was represented by “meeting with friends,” which had an average response value of 0.488. The factor of cultural activities was represented by “surfing the Internet,” and the average response value was 0.677. The factor of fitness exercise was represented by “taking part in physical exercise,” and the average response value was 0.602. The average value of the latter three factors fluctuated up and down 0.5, indicating that the frequency of the latter three factors was less than several times a month, but a response indicating that the respondent had never participated in these activities was never given.

(4) Spouse status. For most Chinese women, marriage has a great impact on their outlook on life and values. To study how much influence a spouse has on female class identification, it is necessary to screen the women’s marital status. One of the questions about marital status in the CGSS2015 questionnaire is “What is your current marital status?” Women who choose “unmarried” are asked questions related to their parents, and the sample data of women with spouses are automatically screened out through stata15.0 software. The literature review reveals that the main factors related to female class identification are the spouse’s education level, political status, and work unit type. Similar to the research on the mother’s intergenerational influence, these three factors play an essential role in the social status of female spouses. In the traditional Chinese concept, the social status of female spouses will also affect women’s judgment on their social class. The evaluation of females’ spouse education level is the same as that of mother’s intergenerational influence research, with an average of 1.966, indicating that most women’s spouses have basically a primary or junior high school education. The political status of the females’ spouses is the same as before, with an average value of 0.126, indicating that most spouses are not party members. In the questionnaire, for responses to questions regarding the work unit type of the females’ spouses, the responses indicating the spouse worked in the party and government, enterprises, institutions and the army were assigned a value of 2; responses indicating social organizations and no

work were assigned a value of 1. The average response value was 1.593, indicating that the working units of female spouses were mainly concentrated in the party and government, enterprises, institutions, and the army.

Control Variables

The control variables are mainly the individual factors influencing female class identification: the female’s age, political status, marital status, education level, work status, the household registration type, social equity, housing property rights, family economic class, and family class at 14 years old. Among them, age is a continuous variable. Taking the survey year 2015 as the time point, the age of the respondents in 2015 was calculated. After a series of variables such as political status and marital status are selected, the values are assigned according to **Table 1**. In particular, this paper selects the property rights index of the house as the control variable, because the Chinese people think whether the house property certificate contains the owner’s name is an important feature of family status. The age of 14 is an important period of human brain development (Hicks et al., 2015), as the family’s class at the women’s age of 14 will deeply affect the surveyed women’s view of hierarchy. Through the data statistics, we found that the average age of the investigated women was 50.018, and the standard deviation reached 16.702, indicating that the age difference of the investigated women was very large. The average value of the women’s political status was 0.045, indicating that women who were not party members accounted for a large proportion of the respondents. The average marital status of women was 0.928, indicating that unmarried women occupied a small proportion of the respondents. The average education level of women was 1.792, which indicates that most of the women surveyed had a primary or secondary school education. The average value of women’s work status was 0.806, which indicates that most women’s jobs are non-agricultural, a finding that is more in line with the current main working conditions. The majority of the workers are employed in non-agricultural industry, as the employment in the agricultural industry is gradually decreasing. The average value of the female household registration type was 1.312, which indicates that female respondents have a disposition to agricultural household registration. The average value of the women’s sense of social justice was 3.194, which is relatively balanced. The average value of the women’s housing property rights was 0.358, indicating that most of the surveyed women did not own their own housing property rights. The average value of the female’s family economic status was 2.662, i.e., close to 3, which indicates that most women think their family economic status belongs to the middle or lower class. The average family class of women at the age of 14 was 1.381, indicating that most of the surveyed women considered their family class to be middle or lower class at the age of 14.

MODEL CONSTRUCTION AND RESULT ANALYSIS

Model Construction

Since quantifying the female stratum requires an ordered variable, we chose the ordered logit model for the analysis.

After the data were processed, the multicollinearity test of the data was first carried out (Yu et al., 2015; Cavalletti and Corsi, 2018). According to the variance inflating factor (VIF), the larger the value is, the more serious the multicollinearity between explanatory variables is. Generally, when the value of $VIF \geq 10$, it means that there is serious multicollinearity between explanatory variables and other explanatory variables. When the value of VIF is closer to 1, it means that the multicollinearity is weaker. In this paper, the mean value of multicollinearity is 1.39, and the multicollinearity among the variables is < 3 , thus, there is no multicollinearity in each index. Therefore, we can analyze the influence of each index variable on female class identity. The formula is as follows:

$$Y_i^* = \beta X_i + \varepsilon_i \quad (1)$$

Among the variables, Y_i^* is the potential female class identity, $X_i (i = 1, 2, \dots, n)$ denotes the variables affecting the female class identity, β is the parameter to be estimated, and ε_i is the random disturbance term. The corresponding relationship between the unobservable potential variable Y_i^* and the observable variable Y is as follows:

$$Y = \begin{cases} 1, & Y_i^* \leq \mu_1 \\ 2, & \mu_1 < Y_i^* \leq \mu_2 \\ 3, & Y_i^* > \mu_2 \end{cases} \quad (2)$$

Among them, the actual observed female class identity is Y , with values of 1, 2, and 3 indicating the lower, middle and upper levels, respectively; μ_1 and μ_2 are the cutting points, both of which are parameters to be estimated, and $\mu_1 < \mu_2$.

Explanatory Variables and Female Class Identification

To study the influencing factors of female class identification from different perspectives, this paper establishes five different models: model 1 is only the control variable; model 2 adds the “gender consciousness” factor to model 1, model 3 adds the “mother’s intergenerational influence” factor to model 2; model 4 adds the “lifestyle” factor to model 3; and model 5 adds the “spouse status” factor to model 4. Through the results of each model, we can see the significant characteristics of each index variable.

Results Analysis

Through the use of different research angles to study the influencing factors of female class identification, the results in **Table 2** are obtained. Therefore, the results of each model can be analyzed separately.

Gender Consciousness and Female Class Identification

Model 2 is based on the control variables of model 1, to which various factors of gender consciousness are added in order to carry out the research. The gender division of labor consciousness is found to have a significant positive effect at the level of 1%, which indicates that the more women agree with the view that “men focus on career, women focus on family,” the higher the

women’s class consciousness. The main reason for this is that most Chinese women are more traditional. When their husbands are successful in their careers, women are willing to be their supporters. The more successful their husbands are, the greater they feel that their own class will be promoted. At the level of 1%, marriage consciousness has a significant negative impact on class consciousness, which indicates that the more women accept the view that “having a good marriage is more important than having a good job,” the lower their own class consciousness. Especially in the marriage market, many women hope to change their own class through marriage, and such women generally have low self-recognition. Gender discrimination in employment is significant at the level of 5%; that is, the more women agree that “female employees should be fired first when the economy is depressed,” the higher the women’s class consciousness, which is inconsistent with the original hypothesis. In conclusion, hypothesis H1 of gender consciousness has been partially verified.

Mother’s Intergenerational Influence and Female Class Identification

Model 3 is based on the addition to model 2 of various factors of the mother’s intergenerational influence. Based on a literature review and the psychological definition of a family relationship, the main factors selected in this paper are as follows: the mother’s highest education level, political status, and work status. However, these three indicators are not significant. Therefore, in this study, we refuse to assume H2 and find that mothers have no influence on the class identification of the next generations of women in the family. The reason may be that with the gradual popularization of modern social views and the increasing number of female workers, the acceptance of the former view that “men are in charge of the outside world, and women are in charge of the interior” or “housewives” has now been reduced. Therefore, the working status of mothers has little impact on the female class identification of the next generation.

Lifestyle and Female Class Identification

Model 4 is based on the addition of various factors of lifestyle to model 3. In model 4, the factors of lifestyle are not significant, which shows that the improvement of lifestyle has no influence on female class identification. However, note that in model 5, after considering the influence of the female’s spouse, the social activities show a significant negative influence at the 10% level, while fitness exercise shows a significant positive effect at the 10% level. This may be because women will put more energy toward family after marriage. If women’s social activities are too frequent, it is not conducive to family harmony and can thus affect women’s class identification. The positive effect of fitness exercise may be because the couple’s fitness exercise can promote the relationship between husband and wife but can also increase the happiness and sense of gain in women’s daily life such that it can enhance women’s class identification. Therefore, hypothesis H3 is partially proved, indicating that lifestyle has some influence on female class identification.

TABLE 2 | Analysis of factors affecting female class identification. *Source:* Author's own elaboration from the models' results.

Independent Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Gender consciousness					
Gender division of labor consciousness		0.111*** (0.039)	0.120*** (0.041)	0.115*** (0.042)	0.041 (0.068)
Gender ability consciousness		0.028 (0.038)	0.027 (0.041)	0.028 (0.041)	0.059 (0.067)
Marriage consciousness		-0.098*** (0.036)	-0.099*** (0.038)	-0.102*** (0.038)	-0.053 (0.064)
Gender discrimination in employment		0.093** (0.040)	0.107** (0.043)	0.110** (0.043)	0.132* (0.079)
Housework distribution consciousness		0.027 (0.038)	0.016 (0.041)	0.007 (0.042)	0.014 (0.071)
Mother's intergenerational influence					
Mother's education level			-0.072 (0.059)	-0.072 (0.059)	-0.900 (0.092)
Mother's political status			0.173 (0.342)	0.175 (0.343)	0.094 (0.495)
Mother's work status			0.131 (0.106)	0.133 (0.107)	-0.019 (0.178)
Lifestyle					
Leisure reading				-0.140 (0.091)	-0.207 (0.148)
Social intercourse				0.030 (0.059)	-0.191* (0.105)
Cultural activity				0.016 (0.062)	-0.126 (0.096)
Fitness exercise				0.076 (0.051)	0.182* (0.089)
Spouse status					
Spouse's work unit type					0.142 (0.095)
Spouse's education level					0.267* (0.144)
Spouse's political status					-0.077 (0.237)
Control variables					
Female age	0.005 (0.003)	0.004 (0.003)	0.001 (0.003)	0.001 (0.004)	-0.002 (0.008)
Female political status	0.313 (1.953)	0.296 (0.197)	0.320 (0.213)	0.308 (0.212)	0.419 (0.375)
Female marital status	0.387** (0.160)	0.361** (0.164)	0.356** (0.172)	0.344** (0.174)	
Female education level	0.940** (0.042)	0.121*** (0.044)	0.127*** (0.048)	0.111** (0.050)	0.042 (0.097)
Female work status	0.021 (0.045)	0.033 (0.046)	0.034 (0.049)	0.030 (0.050)	0.132* (0.778)
Female household registration type	0.079 (0.092)	0.110 (0.095)	0.176* (0.104)	0.165 (0.106)	-0.068 (0.180)
Female sense of social equity	0.233*** (0.036)	0.212*** (0.037)	0.233*** (0.040)	0.230*** (0.040)	0.221*** (0.069)
Housing property rights	0.095 (0.075)	0.101 (0.078)	0.099 (0.083)	0.115 (0.084)	-0.007 (0.150)
Female family economic class	1.112*** (0.055)	1.097*** (0.057)	1.136*** (0.062)	1.122*** (0.062)	1.209*** (0.118)
Female family class at 14 years old	1.552*** (0.086)	1.590*** (0.089)	1.569*** (0.095)	1.562*** (0.096)	1.696*** (0.165)
R^2	0.184	0.186	0.191	0.190	0.203

In this table, the numbers in brackets indicate the standard deviation; the numbers outside the brackets represent the explanatory variables, and the significance meaning is attached after them. *, **, and *** denote significance at the 10, 5, and 1% levels, respectively. The blank in the table indicates that the indicator variable is not used in the corresponding model.

Spouse Status and Female Class Identification

Model 5 establishes a model of a married female's class identification. From the model, it can be found that the education level of a spouse has a significant effect on female class identity at the level of 10%. In reality, when women are looking for marriage partners, the partners' education level is a very important choice factor; this view can be proved by the finding that the spouse's education level has an important impact on the married women's class identification. However, there was no significant effect of the spouse's work unit type and political status on the women's class identification. Therefore, hypothesis H4 has been partially proved.

Female Personal Characteristics and Female Class Identification

In model 5, we can clearly find the significance of each control variable index. The working status of women is positively significant at the level of 10%, which indicates that the social stratum identity of women in non-agricultural work is higher than that of women in agricultural work or unemployment. The women's sense of social justice is significant at the level of 1%, which indicates that the women's feeling regarding the fairness of social justice is very important for female class identification. The economic status of the women's family is positively significant at the level of 1%, which proves the importance of family economic status to women. The better the family economic status is, the higher the class identification of women. The family class of women at the age of 14 is significant at the level of 1%, as the age of 14 is a critical period for the formation of one's values. Therefore, the family class at the age of 14 will affect the women's future class identification, which is a finding consistent with the statistical results.

CONCLUSION AND DISCUSSION

Conclusion

With the continuous progress of social civilization, gender equality has always been the goal advocated and pursued by modern society (Zajacova, 2006; Nyman et al., 2018). The countries in the world have made great progress in improving laws and regulations and protecting the women's status (Besamusca et al., 2015; Koburtay et al., 2020). However, have the women's own values truly progressed with the development of society? Can a woman recognize herself based on the feelings from the bottom of her heart, not from the external evaluation or her husband? When the female individual subjective social class identity is higher, it shows that they are confident about their situation, considering a higher social class and a higher degree of identity and dependence on society. The more critical practical significance is that the level of women's social subjective cognition is directly related to the effective solution of many social problems, the likelihood of influence on the relationship with other social members, and the resolution of social contradictions (Hudson, 2015; Cole, 2020).

Based on the CGSS2015 data, in this paper, a female class identity framework is constructed and the ordered logit model is used to analyze the influence of gender consciousness, mother

intergenerational influence, lifestyle, and spouse status on the women's class identification. The conclusion is as follows: (1) the factors of gender consciousness have a significant impact on female class identification; (2) the factors of the mother's generation have no influence on female class identification; (3) on the premise that women have spouses, the factors of lifestyle have some significant effects on female class identification; (4) the status of the spouse, especially the education level of the spouse, has a significant positive impact on female class identification.

Discussion

The main contribution of the study is that, compared with previous studies (Zipp and Plutzer, 1996; Hudson, 2015; Leicht et al., 2017; Zang, 2020), this paper does not only consider the influence of a single factor, but also comprehensively considers several essential factors that may affect the formation of class concept in women's personal growth experience to restore the process of the construction of women's class concept. The results of the model further not only prove that gender consciousness and spouse status have the significant effects on women's class identity, but also indicate that mother intergenerational influence has little impact on women's class identity. This is also a vital breakthrough compared with previous studies. The influence of mother on daughter may not be as significant as people think. The shaping of postnatal concept is more important, highlighting the importance of social guidance and the formation of ethos.

However, there are some limitations in this study. This paper only considers the whole class concept of women. There are significant differences in the growth environment and education situation between urban and rural women in China, which is also the direction of our future research. Besides, there are still insufficient indicators in this paper. For example, there are only three indicators related to the mother's intergenerational influence and spouse status, which may not fully explain. And our research takes women's marriage as the end of the research period, but women may also experience some changes in their middle and old age. If we can consider a more extended period, that is, to study all the influencing factors of women's whole life class identity, the interpretation of women's class research will be more accurate. The last limitation is that we only used CGSS data, and the regional differences factors are not taken into account. In the future, we can use the relevant international public data to conduct more comprehensive research, especially compare the differences in factors influencing female class identification between different countries and regions.

From the conclusion of this study, there are many factors that affect the women's class identification. Therefore, it is necessary to improve the women's ability and strengthen the women's consciousness of power. It is suggested that women's class identification should be promoted from the following aspects.

(1) Protecting women's basic rights and interests

Much discrimination toward women still exists in society; one obvious example is the gender discrimination in the process of job hunting (Uunk, 2015; Andersson and Harnois, 2020; Kuhn et al., 2020; Takahashi et al., 2020). Some companies do not recruit female job seekers even though there are no explicit regulations for recruitment. For women who have given

birth or are about to give birth, the company will give the opportunities that originally belonged to them to male employees or new employees, which not only increases the reproductive pressure of women but also increases the work pressure of women. Therefore, women should be given tolerance and equal treatment in vulnerable periods, such as illness, childbirth or family changes. Therefore, we should also improve the relevant laws and policies to protect the rights and interests of women in employment and entrepreneurship. From the perspective of the overall interests of the society, if, as mothers, women have independent work, they can not only gradually get rid of their dependence on their spouses but also strengthen their own class identification. Especially for the next generation, confirming the so-called adage “teaching by example is better than words,” the example these mothers will create better. In 2020, China’s newly revised “Civil Code” has strengthened the superior protection of women’s rights and interests, provided more trustworthy and reliable legal protection for women, and rectified all kinds of adverse social phenomena affecting women. In particular, the law includes such contents as rural women’s right to land (Han et al., 2019; Doss and Meinzen-Dick, 2020), opposition to sexual harassment and privacy protection, and recognition of women’s family contribution. These newly drafted legal provisions have built a solid legal barrier for promoting gender equality and women’s all-around development. While emphasizing the equal civil legal status of men and women, the superior protection of women’s rights and interests has been strengthened. For the protection of women’s class, the law has made some progress, but it still needs women’s awareness and fight for their rights and interests.

(2) Promoting women’s independent education

Real equality is the equality recognized by one’s own heart. Some women firmly believe in gender inequality and therefore enjoy the goods or the treatment that they receive from their weak position as women. However, in fact, real equality comes from women’s deep recognition of themselves. When they have the confidence, they can fight for the rights they deserve and will not let others take advantage of women’s status. Therefore, in the new era, we should implement the concept of women’s self-reliance, and women should pursue a completely independent life. In view of this, the state can also carry out various training lectures in order to strengthen women’s skills and can conduct public welfare activities in order to improve women’s cultural literacy so that women can have a greater sense of participation and happiness in society.

(3) Enrich national entertainment activities

The grass-roots government can better promote the participation of all people in entertainment, especially the collective entertainment activities involving the family as a unit. These activities play a very important role in promoting family harmony and women’s class identification. In addition, these types of activities also effectively enable women to avoid the role of only being a housewife and increase their sense of social participation, the lack of which can lead to their disconnection from society and then the reduction of their social identity.

(4) Improving women’s education

With social progress, the level of development of rural areas will gradually catch up with that of the cities (Zajacova,

2006; Fagertun, 2017; Dong et al., 2019; Baylina and Rodó-Zárate, 2020). However, in some surveys, we can still find the differences in women’s status between urban and rural areas (Pedersen, 2016; Andersson and Harnois, 2020). At present, there are still many girls who do not have the opportunity to study. Therefore, in the process of promoting women’s status, rural areas are still the most important and the most difficult bottleneck to break through. In rural areas, we should not only strengthen the legal protection of women and change rural women’s views on gender equality but also protect the right of rural girls to receive education and promote rural women’s employment opportunities (Wang et al., 2013).

Gender equality is advocated by many countries in the world (Nyman et al., 2018; Gupta et al., 2019; Łapniewska, 2019; Koburtay et al., 2020). However, little attention has been paid to women’s own class identification, especially the influence of women’s personal growth experience on their own class identification. Moreover, the degree of this influence has not been fully studied. Based on women’s personal growth experience from youth to middle age, to study the factors that dominate female class identification, this paper creatively constructs a female class identification framework from five aspects: the mother’s intergenerational influence, female personal characteristics, lifestyle, gender consciousness, and spouse status. This study can provide a theoretical and practical reference for further promoting gender equality, women’s own class identification and women’s psychological health.

DATA AVAILABILITY STATEMENT

The raw data supporting the conclusions of this article will be made available by the authors, without undue reservation.

AUTHOR CONTRIBUTIONS

PC and JZ: conceptualization, methodology, formal analysis, writing—original draft, and writing—review and editing. PJ: conceptualization, formal analysis, writing—review and editing, funding acquisition, and project administration. ZZ: methodology and funding acquisition. All authors: contributed to the article and approved the submitted version.

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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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