The Education of Gender
The Gender of Education
Sociological Research in Italy

Maddalena Colombo
Luca Salmieri

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CONTENTS

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10
Contradictions and Critical Limitations of the Gender Category in the Use of OECD-PISA Datasets

Marialuisa Villani and Chiara Carbone

INTRODUCTION

The conceptual focus of the theoretical excursus presented here is the category of "gender" and its intersections with the design of standardized educational assessment tools. Our aim with this chapter is to contribute to fostering deep thinking about gender analysis and its interpretation in relation to large-scale assessments in the field of education. This attempt is part of ongoing reflection conducted through an exploratory study with an analytic-epistemological purpose: to begin interpreting gendered PISA (Program for International Student Assessment) dissemination publications using a combined quanti-qualitative analytical approach.

PISA is the OECD's (Organization for Economic Co-operation and Development) Program for International Student Assessment. It is used to measure 15-year-olds' ability to apply their skills and knowledge in reading, mathematics, and science. Since 2000, the PISA assessment has been conducted every three years and in over 90 countries. In this chapter we outline the epistemological issues surrounding the design of the assessment and the gender category in particular. Furthermore, we investigate the idea of gender that is disseminated through this standardized assessment as well as the analyses conducted by OECD and reproduced in part by the scholars who use PISA datasets for their secondary analysis. This initial analysis is aimed at developing an interpretative framework of the processes through which gender inequalities are reproduced through the erroneous use of the categories of sex, gender, and gender identity (Sullivan, 2020).

We have chosen to focus on PISA because the OECD has come to represent the leading organisation in statistical data design and production in the field of education specifically thanks to the implementation and dissemination of its assessment program (Bottani, Vrignaud, 2005; Morgan, 2011; Sellar, Lingard, 2014; Pettersson, 2014).

In response to the array of issues raised by second-wave feminism and especially Simone De Beauvoir's book *The Second Sex*, the western world began reflecting on the concept of difference as a category of analysis. The acknowledgment of women's specificity that is central to De Beauvoir's work is expressed in different forms and with different emphases; indeed, this ground-breaking idea points to the existence of rich and fruitful "feminine" reflection taking place even in fields traditionally considered "male domains" such as history, philosophy, the social sciences, and politics: in short, the "public" dimension of culture.

This innovative concept drove thinkers to recognize the need to overcome the dominant patriarchal vision positing women as "the other" and "the second sex", subordinated to "the first sex", that is the male sex, commonly treated as "the norm". This hierarchical division also provides the foundations for society's heteronormative structure and the concept of normativity (Butler, 2006). Such conceptual developments paved the way for the perspective considering the category of gender to be a social construction built around the male and female sexes and through which we can connect our reflection to Simone de Beauvoir famous assertion that «one is not born, but rather becomes, a woman» (De Beauvoir, 1989: 273). Feminists introduced the term gender during the Seventies to highlight the fact that sexual difference, a fundamentally biological aspect, is different from that which is socially and culturally constructed. Gender has been used, therefore, as a code implying reciprocity, that is, a constant dialectic between its basic components. In social research, gender is frequently treated as a dichotomous variable because the introduction of a gender perspective leads to prioritising female and male experiences, reinforcing what is considered normative and what is not. It might instead be useful to consider the gender category as an analytical tool with its own heuristic capacity and to take into account its dynamic and fluidity. In light of this point and building on the insights of poststructuralist theories, contemporary feminist thinking has stressed that it would be fair, desirable, and non-discriminatory to replace the binary with a plurality of possibilities capturing the complexity of human beings. In this feminist work, the rigid conception of gender conveyed by the normative binary distinction has been translated into multiple positionings, thereby moving beyond masculine-feminine polarization.

Looking at the relationship between gender and education during the late Sixties and early Seventies, feminist scholars searched for ways to unveil and break down common stereotypes linked to roles that would have in some way disadvantaged one or the other gender in the school setting. In poststructuralist feminist epistemology, scholars' rejection of the binary notion marked their acceptance of the idea that gender is fluid. In so doing, postmodern theoretical formulation acquired a powerful sense of creativity: human beings, such theories asserted, can invent themselves and become whatever they need and desire to be. In educational research, however, the application of the interpretative paradigm of postmodern gender theory to local or situated realities has yet to be deeply examined or developed (Pillow, 2000).

As national and international assessment programs were developed in western societies, standardized tools were formulated to evaluate

educational performance; the PISA evaluation tool in particular has come to be used widely as the main tool for carrying out international comparisons and guiding the decisions of national educational policy makers. When referring to standardized evaluation procedures, it is essential to bear in mind that the inclusiveness of this tool is epistemologically debatable. Indeed, scholars (Carvalho, Costa, 2014; Sjøberg, 2015; D'Agnese, 2015) have raised doubts about the epistemological efficacy of evaluation systems on the grounds that international surveys are validated in multiple and sometimes highly heterogeneous school systems without considering the situated, local system of knowledge operating in each case (Connell, 2009). Another set of critiques has to do with the way the tests and their content are constructed, suggesting that the cultural belonging and subjectivities of those who write the tests cannot help but condition the way they are put together. The literature in this field is aimed at demonstrating that the construction of these standardized tests is strongly influenced by a western, heteronormative point of view and the confused conception of gender that prevails in international large-scale education assessment (ILSA) tools (Mons, 2009; Carvalho, 2012; Carvalho, Costa 2014, D'Agnese, 2015; Addey, 2017)

2. METHODOLOGY

We conduct a qualitative analysis of the content of PISA reports (2015-2018), specifically focusing on the 2015 report *The ABC of Gender Equality in Education: Aptitude, Behaviour, Confidence* (OECD, 2015). The challenge is to apply an epistemological gender perspective to the analyses of the heteronormative data production (Mons, 2009) of PISA reports and the secondary analyses carried out using PISA databases.

We have considered 14 articles analysing PISA data and gender differences for the period 2002-May 2020, that is, from the first to the most recent secondary analyses of PISA data. We are aware that the number of articles considered here is limited, and indeed our work is not intended to produce generalizations but rather to constitute an initial step forward. Employing the mixed-method framework (Greene et al., 1989) in a complementary way, we will go on to use the outcomes of this work to guide text-mining analysis (Ferreira Mello et al., 2019) to be carried out between winter and spring 2021.

3. GENDER AND PISA

PISA 2018 Insights (OECD, 2019b) describes a small gender gap in mathematics and the sciences. If we analyse the national scores in mathematics for some of the countries more relevant in this area, however, the

results indicate a different situation. While the OECD average of the mathematics gap is 5 points in favour of males, the Italian average, for example, is 16 (OECD, 2019b). However, methods and processes of building female and male identities in school vary according to the cultural framework of each local context, and consequently give rise to different behaviours and different PISA results. As Meier and Diefenbach (2020) claim, the OECD epistemological framework is built on a dichotomous idea of gender. This is true despite the OECD's declaration in the *ABC of Gender Equality in Education* report (OECD, 2015: 3) that:

> Gender disparities in performance do not stem from innate differences in aptitude, but rather from students' attitudes towards learning and their behaviour in school, from how they choose to spend their leisure time, and from the confidence they have – or do not have – in their own abilities as students (OECD, 2015: 3)

According to Meier and Diefenbach (2020), OECD reports employ an untheorized concept of gender following a traditional dichotomous formulation. In addition, there is no reflection on the educational and scientific implications and biases related to the dichotomous gender concept.

To move forward with a content analysis of PISA reports (2015, 2018), we consider the relationship between the cognitivist framework of the PISA program and the use of gender category in PISA analysis. We define PISA's paradigm as a cognitivist one because of the way the object is defined and measured in the OECD program. Specifically, to achieve good results in the three areas under investigation, students must have developed problem-solving skills (OECD, 1999). Bacchi (2020) finds that the definition of problem-solving underlying the PISA epistemological framework is a «technocratic», «expert-led» conceptualization of the idea of problem-solving and learning process. Therefore, students' success in the PISA test depends mainly on their acquiring rules and standards that can be correctly employed in effective processes of learning and building a subjectivity ready to meet the needs of the labour market. This viewpoint echoes that of other scholars (Bottani, Vrignaud, 2005; Mons, 2009; Villani, 2018) who also highlight the normative nature of PISA. The expansion of this cognitive paradigm impacts the concept of gender disseminated through PISA.

The PISA cognitivist paradigm uses attitudes, variables and indexes as causal predictors in gender-focused analysis to explain "the gender gap" in students' performance. In the 2015 report, the indicator of self-confidence in maths is used as a causal predictor of girls' lower performance:

> In fact, PISA reveals that students who have low levels of mathematics and science self-efficacy perform worse in mathematics and science than students who are confident about their ability to handle mathematics and science tasks (OECD, 2015: 71).

> Even many high-achieving girls have low levels of confidence in their ability to solve science and mathematics problems and express high levels of anxiety towards mathematics. Results presented in Tables 3.1b and 3.2b indicate that even among boys and girls who are equally capable in mathematics and science, girls tend to report lower levels of subject-specific self-efficacy and self-concept. This means that while girls' lower performance in mathematics and science among the highest-achieving students may reflect lower levels of self-

> confidence and higher levels of anxiety, the differences in levels of self-confidence and anxiety between boys and girls are greater than differences in mathematics and science performance (OECD, 2015: 78).

We postulate three specific problems: the first lies in the binary representation of gender, that is, treating gender as if it were sex; the second has to do with the way OECD analyses reproduce and normalize low levels of mathematics self-confidence among girls (Meier, Diefenbach, 2015); and the third is the use of an epistemological link in applying attitude variables as elements with a causal effect on students' performance. We have found that attitudes are considered a linear, causal variable in the PISA epistemological and theoretical framework. Sociological analysis of pupils' attitudes instead suggests that these are "circular variables" in the sense that attitudes can be dependent or independent variables in relation to school behaviour (Giancola, Viteritti, 2014).

Analysing the analytical and assessment framework reports for PISA 2015 and 2018 (OECD, 2017, 2019), we find the attitudes variable used as a causal variable to explain students' performances in sciences and financial literacy (OECD, 2017; OECD 2019). The epistemological problem surfaces when these indicators are used as causal predictors of school achievement, as they do not consider the effect of structural and socio-economic inequalities that influence the information conveyed by the indicators (Rindermann, 2018). In PISA, the variables representing students' attitudes at school are considered predictors of school performance, i.e. they are used as a causal element to explain students' performance (OECD, 2017, 2019a). The variables that measure attitudes (which are generally charted in PISA through attitudinal scales, i.e. Likert scales) related to student performance can produce a spurious correlation. It thus follows that it is not possible to establish whether attitudes indicators are the cause or the effect of pupils' performance.

Our aim is not to critique the statistical reliability of the attitude indicators designed and implemented in PISA; rather, we point out the epistemological bias produced by the normative PISA framework. The OECD uses the variable of self-confidence in mathematics in a way that can produce two kinds of bias. First, the use of the pupils' attitude variable as a causal variable instead of a covariance variable. Second, in the OECD 2015 report, researchers assume that girls' lower performance scores in mathematics are directly related to their lower level of confidence in mathematics (OECD, 2015). In this case, the circularity effect of attitude variables makes it all but impossible to ascertain whether the low level of self-confidence is a cause or result of girls' poorer performance in mathematics (Meier, Diefenbach 2015).

In contemporary society, mathematics skills play an increasingly crucial role in multiple professional fields, especially those involving scientific and technological innovations. Scholars define this trend as a «stereotype threat» (Nguyen, Ryan, 2008) and argue that it could drive girls to avoid competing with boys. It is therefore possible to say that gender differences in mathematical skills translate into real forms of inequality and, on the other hand, that gender inequalities affect individuals' educational and professional trajectories.

Our analysis of PISA documents suggests that the OECD paradigm leads to the exclusion of students' minority traits (mental and physical learning disabilities, linguistic background, belonging to the SOGIESC community) from the assessment (OECD 2018). The use of PISA databases for secondary analysis reproduces this exclusion.

4. THE USE OF PISA DATA SET FOR SECONDARY ANALYSIS AS REPRODUCTION OF GENDER BIAS AND INEQUALITIES

PISA disseminates knowledge that is measured in relation to human capital criteria (Bottani, Vrignaud, 2005; Mons, 2009; Rindermann, 2018) and over the last 20 years and the application of this tool impacted curriculum changes and transformation at a national level, i.e. the case of the transformation of the mathematics curriculum after PISA2000 (Breakspear, 2012). Therefore, it is possible to highlight a regulatory effect of the tools used to carry out assessment (i.e. the transition from assessment paper The PISA disseminates knowledge that is measured in relation to human capital criteria (Bottani, Vrignaud, 2005; Mons, 2009; Rindermann, 2018) and the application of this tool over the last 20 years has brought about curriculum changes at the national level, such as for example the transformation of mathematics curriculum following PISA2000 (Breakspear, 2012). Therefore, it can be said to exercise a regulatory effect on the tools used to carry out assessment (as seen in the transition from paper-based to computer-based assessment) and on the mechanisms for producing and evaluating knowledge acquisition (Carvalho, 2012).

We adopt Williamson's definition of datafication, namely the process that enables us to measure quality, actions and phenomena. The possibility of measuring these elements offers the illusion that the phenomenon in question is objective, wholly overshadowing the theories that have guided the measurement process (Giancola, Viteritti 2014; Williamson, 2018). The result is a linear interpretation of educational phenomena that excludes from the process of analysis all the socio-economic and cultural factors that influence, for example, gender differences in performance between boys and girls (Giancola, Viteritti, 2014; Villani, 2018). To carry out our study, we have conducted an initial analysis of papers in which dataset outcomes are interwoven with gender issues. Some of the selected papers employ only PISA datasets to produce secondary analyses (Stoet, Gery, 2013; Hek et al., 2017), while others also use data from other assessment programs (Saygin, 2018).

In proceeding with our analysis, three recurring, critical issues come to light. These three crucial features can be examined separately or considered in connection: *i*) the overlap between the categories of sex and gender, used interchangeably; *ii*) the habit of interpreting gender gaps in student performance without analysing contextual factors, social background and cultural specificities; *iii*) the absence of a critique of the prevailing binary and dichotomous vision.

TABLE.1 *Main Features of the analysed papers*

Paper Title	Author(s)	Topics	Categories used	Focus	Dataset(s) used
Sex Differences in Mathematics and Reading Achievement Are Inversely Related: Within- and Across-Nation Assessment of 10 Years of PISA Data.	Stoet, Geary (2013)	Reading Mathematics Literacy	Sex	Analysing the performance gap of between boys and girls using the variable of sex, to promote gender equality. No reference is made to any conceptualisation of gender	PISA 2000, 2003,2006,2009
Strengths and Weaknesses in the Swedish and Swiss Education Systems: A Comparative Analysis Based on PISA Data.	Fredriksson et. al (2009)	Reading Mathematics Literacy	Gender	Analysing PISA results for Switzerland and Sweden. No reference is made to any conceptualisation of gender.	PISA 2000-2003
La influencia del género en el aprendizaje matemático em España. Evidencias desde PISA	Fuentes de Frutos, Renobell Santara (2020)	Mathematics Achievement	Gender and Sex	The intergenerational transmission of gender and role performances.	PISA 2000-2003-2006-2009-2012-2015
Cross-National Gender Gaps in Educational Expectations: The Influence of National-Level Gender Ideology and Educational Systems	Mcdaniel, (2010)	Educational expectations	Gender and Sex	Gender differences in educational expectations. No reference is made to any conceptualisation of gender.	PISA 2003
Examining gender DIF and gender differences in the PISA 2018 reading literacy scale: A partial invariance approach	Khorramdel et. al (2020)	Reading Literacy	Gender	Gender differences in reading due to gender-specific differential item functioning. No reference is made to any conceptualisation of gender. The authors consider 3 sources for the gender gap: socio-cultural, bio-cognitive, and test-taking.	PISA 2018
Gender Differences and Similarities in PISA 2003 Mathematics: A Comparison between the United States and Hong Kong	Liu, O. L, Wilson M (2009)	Mathematics	Gender	A dichotomous "male"/ "female" analysis, comparing performance scores between students in the USA and Hong Kong.	PISA 2003
Do schools affect girls' and boys' reading performance differently? A multilevel study on the gendered effects of school resources and school practices	Hek et al. (2017)	Reading Literacy	Gender and sex	Investigating how school characteristics (resources, teachers, proportion of girls) influence girls' reading performances. No reference is made to any conceptualisation of gender.	PISA 2009
Gender gaps in PISA test scores: The impact of social norms and the mother's transmission of role attitudes	González de San Román, de la Rica(2012)	Reading and Mathematics Literacy	Gender	The intergenerational transmission of gender role attitudes, especially from mother to daughters, as well as girls' performances. The authors develop a conceptualisation of gender as a social construction.	PISA 2009
Gender-differences in Self-efficacy ICT related to various ICT-user profiles in Finland and Norway. How do self-efficacy, gender and ICT-user profiles relate to findings from PISA 2006	Tømte, Hatlevik (2011)	ICT	Gender	Exploring the relationship between self-efficacy, Information and Communication Technology (ICT) user profiles, and gender. No reference is made to any conceptualisation of gender.	PISA 2006
Reading, Gender, and Engagement: lesson from five PISA countries	Brozo et al (2014)	Reading Literacy	Gender	Bringing attention to bear on the intergenerational transmission of positive roles from fathers to sons, to improve boys' reading performances. The authors develop a conceptualisation of gender as a social construction.	PISA 2000, 2009
Debunking Myths about Gender and Mathematics Performance	Kane, Martz (2012)	Mathematics Literacy	Gender and sex	Producing an econometric and dichotomous analysis of pupil performances. No reference is made to any conceptualisation of gender.	PISA 2009, TIMMS 2007, IMO 2001–2010
Can test construction account for varying gender differences in international reading achievement tests of children, adolescents, and young adults? – A study based on Nordic results in PIRLS, PISA and PIAAC	Solheim, Lundetræ (2018)	Reading Literacy	Gender	Comparing how reading literacy is operationalized in these surveys; the product is a dichotomous analysis. No reference is made to any conceptualisation of gender.	PIRLS 2011, PISA 2009 and PIAAC 2012
Automatically analysing text responses for exploring gender-specific cognitions in PISA reading	Zehner et al (2018)	Reading Literacy	Gender	Cognition elements in reading performance scores; the product is a dichotomous analysis. No reference is made to any conceptualisation of gender.	PISA 2012
A Multidimensional Rasch Analysis of Gender Differences in PISA Mathematics	Liu et al. (2008)	Mathematics Literacy	Gender	Dichotomous analysis and statistics models. No reference is made to any conceptualisation of gender.	PISA 2003

The overlapping between the categories of sex and gender is a critical issue across all 14 of these publications. Specifically, it is possible to identify the category of gender assigned the same theoretical significance as the variable of sex in Fredriksson et al. (2009) and Zehner et al. (2018). In Mcdaniel (2010), we found both gender and sex categories used without considering gender as a social construction, and indeed the category of gender is used interchangeably as a synonym for sex.

In some cases, researchers can be seen to employ a stereotype about belonging to sex-based categories, as in Brozo et al (2014) and Kane and Martz (2012). In Kane's study in particular, the lack of STEM orientations among girls is connected to their belonging to the sexual category "female" and considered a "natural tendency" instead of a "cultural-social construction":

> In addition, women's nature might include a tendency to prefer the more nurturing fields, such as nursing and teaching young children, to the more quantitative ones, such as mathematics, physics, and engineering. If so, it might not make sense to encourage and direct any but the unusual female toward studying and seeking employment in these latter fields. (Kane and Martz, 2012: 10)

As for the second critical issue, Zehner and colleagues (2018) explain gender differences following a cognitivist analysis in which mental features are the only and crucial factors producing gaps between male and female reading literacy scores. As seen in the study by Fredriksson and colleagues (2009), the term "gender" is repeatedly used to mean the category pf sex. No mention is made of context factors, social background or cultural specificities.

The first and second issues appear in the article *Sex Differences in Mathematics and Reading Achievement Are Inversely Related: Within- and Across-Nation Assessment of 10 Years of PISA Data* by Stoet and Geary (2013), who analysed PISA datasets from 2000 to 2009. For the 2000, 2003 and 2009 editions, the authors used "sex" as the category of assessment while they switched to "gender" for the 2006 PISA datasets. Stoet and Geary's (2013) paper focuses on sex differences for the evaluation of mathematics and reading performance scores, but the analyses do not include any elements concerning gender socialization in relation to learning.

In Hek and colleagues (2017), the category of gender is not considered at all as the result of social construction processes and ascribed roles; rather, socio-economic factors are used to explain the gender gap and attribute differences between boys and girls to purely economic phenomena.

A social context analysis is provided by two papers in which intergenerational role transmission is considered as a factor which improves performance in PISA tests. For example, González de San Román and de la Rica (2012) analyse the 2009 PISA data for Spain. According to the authors, having a working mother favours intergenerational transmission of the ideal-type of the successful woman, and this ideal counteracts the stereotype of the male breadwinner in the Spanish context.

Brozo and colleagues (2014) analyse PISA datasets on reading literacy scores for the USA in 2000 and 2009. Their aim is to propose pedagogical

tools to foster the intergenerational transmission of interest in reading from fathers to their children. Both papers analyse the gender category, and the authors clearly specify that gender identity is a social construct. However, a gender binary division is still used in analysing parenthood and the intergenerational transmission of models and roles.

Fuentes de Frutos and Renobell Santara's study (2020) displays an attempt at considering context factors, social background, and cultural specificities. The authors find that the gender gap in performance begins after a specific student age and stress the importance of investigating the effect of teaching practices on school results, in relation to both gender and the transmission of roles in education more broadly.

Finally, we found that a critique of the binary, dichotomous vision was missing in many studies, and especially in the work of Solheim and Lundetræ (2018). The researchers explore whether differences in the way "reading literacy" is operationalised can add to our understanding of varying gender differences in international large-scale surveys. The investigation is based on a polarization of male/female variables, and consequently the results display a binary and dichotomous vision of these categories. Tømte and Hatlevik (2011) present a critique of the binary vision of gender analysis but only as a final consideration, while the data analysis itself actually reproduces a binary interpretation of performance. Liu and colleagues (2008) focus their study on statistical models and in particular the Rasch Model, and find that this tool is dichotomous in character. This acknowledgement is important for the purposes of our discussion in this chapter as it does not take for granted the neutrality of the evaluation tools in question.

Despite claims of neutrality and lack of bias, assessment procedures have frequently been found to be gendered. The PISA can provide indicators of how a specific national policy is working in comparison with others, but it is less useful for identifying particular causal factors or revealing what should or could be done to create a more inclusive gender system (Topping et al., 2003). In our view, it is key that researchers seek to strengthen LSA tools but also and especially that they be aware of these tools' limitations (Hopfenbeck, 2016) in order to develop an analysis that deconstructs gender role stereotypes in the context of education. The category of gender plays a significant role in educational evaluation systems in terms of reproducing stereotypes and pre-existing gender models.

CONCLUSIONS

On the basis of our analysis, it seems that the three critical issues appearing in the secondary analyses of the publications in Table 1 give rise to a process of reproducing gender stereotypes (Elwood, 2006). We noticed that the epistemological and critical issues appearing in the OECD report (2017, 2019) are reproduced once again in the secondary analyses formulated in a number of papers (Khorramdel et. al., 2020; Tømte, Hatlevik,

2011; McDaniel, 2011). Gender stereotypes are also reproduced through researchers' methodological choices and statistical analyses; an example is the use of attitude variables as a causal element to explain student performance (Giancola, Viteritti, 2014) in regression models (Khorramdel et. al., 2020; Tømte, Hatlevik, 2011; McDaniel, 2011).

Gender difference is not something that simply exists, as some papers would appear to assume (Brozo et al., 2014; Liu, Wilson, 2009). Rather, gender is generated in practice and, therefore, is actively created in the process of analysis and data production.

The development of sophisticated new technology and statistical tools (Bennet, 2015) allows scholars and experts to investigate phenomena related to gender differences in education with greater accuracy and precision. The gender education policies implemented in response to the political pressure brought to bear by feminist movements have traditionally performed well in spotlighting differential treatment and removing obstacles to the fair treatment of boys and girls. Today, however, it is possible to move forward, imagining how to design standardized evaluation tools in a way that takes into account the fact that sex and gender belonging are two separate spheres within the socialization process.

Western school systems replicate the male-centred societies within which they are embedded. If gender norms are traditional and rigid, therefore, this will directly impact the construction of individual gender identity, gender performance in the school context, the process of socialisation and the way young people perceive themselves in terms of their personal inclination to pursue certain school subjects and skills.

If girls continue to believe and be told that they are less skilled in mathematics then boys, the stereotype could become a self-fulfilling prophecy (Merton, 1949) internalized by girls. Consequently, no evaluation system should ever be considered gender neutral. In reality, they will all continue to reproduce traditional sex-gender differences and stereotypes if we do not decolonize and deconstruct our tools and measurements. The duality of the binary sex system in particular helps to maintain gender hierarchies in education, hierarchies which have been imposed by patriarchy (Lerner, 1986) in its connection with compulsory heterosexuality (Rich, 1980). Breaking with the duality of gender cultures and questioning data collection could be a first step forward in the effort to avoid reproducing traditional gender roles and to overcome the kinds of widespread gaps and disparities highlighted by the above-cited studies.

Despite the disciplinary tensions that have surfaced in the last few decades (Carbone, Jahnke, 2020), it is fundamental that we create an interdisciplinary research space in which gender studies and the sociology of education serve as the keys to nurturing a flourishing debate.

We would do well to avoid the tempting and common tendency to lean heavily on the PISA and other ILSA tools that operate as devices of discipline, and instead strive to generate non-stereotyped analysis and to reduce the risk of gender bias. Specifically, we must critically reflect on the possibility that the overlapping of sex and gender categories is a risk and questionable methodological choice that perpetuates disparities in performance, thereby nurturing stereotypes and self-doubting behaviours.

In our view, continuing to use only two variables (male and female) for the category of gender constitutes a form of discrimination.

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