The Virtues of Engendering Quantitative Methods Courses

Tània Verge, *Universitat Pompeu Fabra*

While gender blindness is still ubiquitous in the political science curriculum (see Ackerly and Mügge, this issue), nowhere is this more prominent than in quantitative methods courses wherein numbers and statistical skills are considered to be neutral and genderless. But are they? On the one hand, as pointed out by feminist empiricism, the selection of research questions, the construction of concepts and the drawing of hypotheses are not value-free, as traditionally sustained by positivist approaches. Rather, they are underpinned by our values and beliefs (Harding 1987). Androcentric biases often shape methodological decisions, including data collection and the selection of variables, with women's experiences and perspectives being rendered invisible and interpreted in empirical analyses as either deviant from the male norm or as natural—social and cultural—differences (Hesse-Biber et al. 2007). Thus, critical omissions of gender may lead to incorrect conclusions (Lovenduski 1998).

On the other hand, many political science students are intimidated by statistics (Buchler 2009). While several situational factors (such as prior knowledge and experience with mathematics and statistics) influence statistics anxiety, it is gender that is of paramount importance among the person-related factors (Onwuegbuzie and Wilson 2003, 196). Female students generally display a more negative attitude towards the difficulties in methods courses, and are not only more pessimistic about their cognitive competence but also deploy higher levels of statistics anxiety than their male peers (see, among others, Slootmaeckers, Kerremans and Adriaensen 2014).

However, it should be noted that both teaching environments and learning practices have been found to provide more accurate explanations of gender performance than those accounts that locate the reasons in female students' characteristics and cognitive styles. Gender-blindness in this area has thus prevented from identifying gender differences as a situated response: pedagogies encouraging students to follow steps rather than to develop an understanding of such steps produce a lower attainment among female students (Boaler 1998).

Having discussed the gendered dimensions of quantitative methods, I introduce how gender can be effectively mainstreamed when teaching such courses. Through specific examples of my Introduction to Statistics course for first-year political science (undergraduate) students, I present how gender mainstreaming is a useful strategy to fight students' anxiety levels, to increase their critical thinking ability, and to tackle the gendered dynamics underpinning teaching environments and learning practices.

GENDER MAINSTREAMING, STUDENTS' ENGAGEMENT AND STATISTICS ANXIETY

Student dissatisfaction with quantitative methods courses stems from both their aversion to statistics and their lack of engagement due to the general disassociation of courses between "research in theory" and "research in practice"; that is, between the methodological skills and the ability to understand, critique and address real-life problems (cf. Ryan et al. 2014, 88). In seeking to increase the relevance of quantitative methods for undergraduate students, the experiential problem-based learning and learning-by-doing approaches (see Winn 1995) offer an excellent chance to mainstream gender, as discussed below.

First year students need our guidance to identify relevant topics of the discipline and to define specific and viable research questions. Also, given that gender topics do not integrate the core pedagogical vernacular of the major (Foster et al. 2013), the chances that gender-related topics are selected spontaneously by students are rather low. I engage students in research projects that apply the methodological skills to real-life gender-related problems. The topics these projects have to revolve around include gender-based violence, women's unpaid labor, gendered welfare-state policies, and women's presence in political and economic institutions.

The course is organized around three assignments. For each of the assignments, specific tutorial guides are provided (see online appendix). The first assignment requires students to do a short literature review around a specific research question of their choice that falls into one of the pre-defined topics. To help students limit the scope of their research question, broad guiding questions are posited, such as: Do welfare policies still build on a male-breadwinner model? What is the relationship between the domestic sexual division of labor and labor market participation? Why should political institutions secure an equal representation of women and men? Which cultural, social and economic factors explain the persistence of gender-based violence?

The basic goal of the first assignment is to engage students with their topic and to enable them to contextualize the data in relation to their research question. Besides gaining some practice with literature reviews, by identifying the scholarship produced on these topics, students come to see these topics as relevant fields of study for political science. In addition,

© American Political Science Association, 2016
doi:10.1017/S1049096516000962
https://doi.org/10.1017/S1049096516000962 Published online by Cambridge University Press

since women make up a significant proportion of authors in gender-related studies, this method contributes to compensating the gender citation gap that is typically found in the syllabi of most courses, and provides students with more diverse role models as regards scientific knowledge.

In the second assignment, students must quantify the phenomena under study and compare them cross-nationally, such as levels of women's numerical representation in national parliaments, the proportion of women in the workforce, the time devoted by women and men to domestic tasks, the proportion of female and male workers taking leaves of absence for caring reasons, the gender pay gap, or the numbers of women killed by their intimate partners. This helps students to reveal and denaturalize male domination (cf. Weldon 2014, 670). Students must not only identify the variables capturing their objects of study but they must also provide their basic descriptive statistics. In addition, they are required to present the information in a graphical way according to the type of measurement of the variables, together with building composite indices after having standardized the variables. Students are given a list of links to open-access databases so that they get acquainted with data sources they may also use in subsequent courses throughout the major (see online appendix). This enables students to "own" their data and to analyze gender inequalities in the real world.

The topics these projects have to revolve around include gender-based violence, women's unpaid labor, gendered welfare-state policies, and women's presence in political and economic institutions.

The third assignment requires students to identify the longitudinal trend of selected variables, to calculate growth rates, and to define a linear or exponential predictive model that, in turn, permits them to answer a specific question. For example, some students are instructed to examine the gender pay gap over a 20-year time span—from selected countries or at the aggregate European Union level—and calculate how much time is needed for it to fade away, all else being equal. Other students must cover the last five electoral periods of two countries using legislative gender quotas and two countries that do not apply such measures to predict when the respective parliaments will reach parity—50% of either sex. This assignment helps students to demystify the fallacy of equality and makes them aware of the pervasiveness of gender inequalities.

FINDING GENDER IN THE DATA AND CRITICAL THINKING

To increase students' sense of ownership of the learning process and overcome statistical fear, it is recommended that students "learn to think critically about the use of numbers that surround them in daily life, how numbers are used to inform and add authority to debates as well as to obfuscate or mislead" (Adeney and Carey 2009, 196; see also Buscemi 1997). Data resources available for the analysis of gender-based discrimination have developed considerably in recent years, being extensive over both time and space and wide-ranging in terms of topics. Sex is usually recorded in surveys—wherein data on some other identities also tend to be provided—and international and national open-access databases allow for disaggregating analyses by gender (see online appendix). While using sex-disaggregated data, students can also be trained to look at the intersection of gender with other axes of subordination, thereby addressing issues of insensitive quantification and exposing the complexity of women's experiences. It should be noted that whereas ethnicity/migration data present availability, quality and comparability (Metso and Le Feuvre 2006, 11), there are still severe problems of a lack of data on LGTBI identities (Olsen, Purdam, and Afkhami 2009, 16).

Quantitative techniques allow the classification of individuals by creating or using an already existing nominal sex variable, as well as crossing it with other identity variables, so that all intersectional identities (subgroups) are uniquely classified. Descriptive techniques (centrality measures such as the median, the mean and the mode, and variance measures, such as the standard deviation and the maximum and minimum values, as well as frequencies for nominal and ordinal variables) can be used to study the different groups and subgroups. Students may also compare attitudes toward women cross-nationally or within a country. Sex and identity variables can also be included in bivariate and multivariate models, sometimes in interaction with other relevant explanatory variables (Spierings 2012).

While gender-sensitive quantitative data enable students to observe the divergence between the rhetorical (formal) and practical (substantive) dimensions of equality, gendering quantitative methods offers students the chance to assess the size of the gender gap and to dig into its potential explanations. This requires going beyond the variable "sex" and helping students to find "gender" in the data (Olsen, Purdam, and Afkhami 2009, 17). Indeed, sex and gender should not be used interchangeably in statistical analyses. The observed differences across sex should not be essentialized but rather statistical analyses should explore how they are produced. This requires tapping into gender norms, roles and structures. A mere "sex-counting" does not suffice to unveil the underlying gender relations reflected in the data. Alternatively, when issues of gender-blindness and gender-biases are carefully addressed in data analyses, quantitative methods allow us to make visible the mechanisms and structures that sustain gender inequalities (Weldon 2014).

In associating "sex" with other outcomes through different statistical techniques, we should help students reflect on the origins of differences between women and men, which can be tested by including in the models various control variables

https://doi.org/10.1017/S1049096516000962 Published online by Cambridge University Press

that are gender informed (Spierings 2012). For example, analyses of differences in male and female employment participation rates need to factor in the hours devoted to housework and caring. Similarly, country-level expectations on marital arrangements and the strength of double binds faced by working mothers, which can be traced through public opinion data, may help us understand gendered patterns in the labor market. In the field of political representation, the numbers of women representatives are also affected by gendered expectations of which sex "makes for better leaders"—a long-standing question included in the World Values Survey. Likewise, the social representativeness of members of parliament is not just hindered by the over-representation of men but also by the under-representation of specific groups of women, such as mothers, due to the care-unfriendly institutional settings (Campbell and Childs 2014).

While gender-sensitive quantitative data enable students to observe the divergence between the rhetorical (formal) and practical (substantive) dimensions of equality, gendering quantitative methods offers students the chance to assess the size of the gender gap and to dig into its potential explanations.

GENDERING PEDAGOGIES

As has been discussed, gender norms influence and may be reproduced in teaching and study environments. Thus, gendering quantitative methods also affects teaching pedagogies. I tackle gender norms in different ways. Firstly, in the first session of the course, besides presenting the practical application of statistics to the profession, I discuss the "stereotype threat" identified by the literature in the fields of mathematics and statistics, which tends to have a higher impact on female and ethnic minority students than on male students (see Spencer, Steele and Quinn 1999). Secondly, students are required to write their research report incrementally—the three assignments already presented. They do so in small groups composed of four or five students. Group work has been proven to help students solve the particular or common puzzles they face while reducing anxiety levels (see Bernstein and Allen 2013, 12). Studies show that the gender composition of groups affects the results of decision-making processes, with women struggling to have their voices heard when constituting a minority (see Mendelberg et al. 2013). In addition, female students take the lion's share of more demanding group work and usually keep up with task deadlines. For these reasons, in teaming up students, to the extent that class composition allows it, I produce gender-balanced groups.

Furthermore, when marking students' literature reviews (first assignment) I not only evaluate the quality of the discussion and presentation of arguments but also point out to students where arguments may have incorporated gendered stereotypes and assumptions. I also make them aware about gender-, race-, and class-biased language. Similarly, when assessing the use of descriptive statistics to delve into their topics (second assignment), I highlight the gender stereotypes underpinning the associations that are so often made by students, such as uncritically reporting that women "prefer" to work part-time without reflecting on the sexual division of domestic and caring responsibilities.

Classroom interactions are also affected by gendered norms. Male students tend to take up oral presentations more often than female students. They also tend to be more active participants in class discussions, especially in large classrooms, and are usually more assertive and faster in responding to questions (Ho and Kelman 2014). For this reason, in the final session of the course, wherein groups are encouraged to share their findings with the whole class, presentations are structured around a 40-minute poster session. Two students from each group alternate to explain their project results while the rest of the students walk through the 'class venue' to learn about other groups' projects. This enables quiet students to feel more comfortable with the presentation. Indeed, under this format, a similar number of female and male students take up oral presentations.

Lastly, the poster session also seeks to enable students to identify the existing relationships between the different topics assigned to the various groups. The poster presentation is followed by an open (yet guided) discussion aimed at problematizing the public-private divide and the pervasiveness of gender inequalities in both spheres. I have found this to be a very useful strategy for demystifying the widespread post-feminist discourse among undergraduate students who view gender inequalities as a thing of the past (see Morrison, Bourke, and Kelly 2005). It should be noted that male students do not feel alienated at all by the gender-related topics used in the course while female students feel more empowered to participate in the class discussion.

CONCLUSION

Gender has everything to do with quantitative methods courses and it provides added value to our teaching. For one thing, it helps students to start thinking as non gender-blind political scientists. Engendering the curriculum through real-life research questions and the use of sex-disaggregated data, together with gender-sensitive teaching strategies brings about a virtuous circle: students' anxiety is significantly reduced and the development of the gender competence equips them to undertake more refined analyses that are also more critical of social inequalities.

As Matthes (2013, 238) reminds us, "political science is a discipline with a history and obligation of addressing the pressing injustices of our democracy. And gender mainstreaming

https://doi.org/10.1017/S1049096516000962 Published online by Cambridge University Press

remains one very good way to continue that tradition" (see also Mügge forthcoming). Therefore, mainstreaming gender into quantitative methods courses is crucial for the development of critical thinking, especially because this new navigational insight enables students to identify and problematize gender inequalities and eventually to put their own attitudes toward gender under scrutiny.

SUPPLEMENTARY MATERIAL

To view supplementary material for this article, please visit http://dx.doi.org/S1049096516000962. ■

REFERENCES

Adeney, Katharine and Sean Carey. 2009. "Contextualising the Teaching of Statistics in Political Science." *Politics* 29 (3): 193–200.

Ackerly, Brooke and Liza Mügge. 2016. "Mainstreaming Gender in the Teaching and Learning of Politics." *PS: Political Science & Politics*. This issue.

Bernstein, Jeffrey L. and Brooke Thomas Allen. 2013. "Overcoming Methods Anxiety: Qualitative First, Quantitative Next, Frequent Feedback along the Way." *Journal of Political Science Education* 9 (1): 1–15.

Boaler, Jo. 1998. "Mathematical Equity—Underachieving Boys or Sacrificial Girls?" *International Journal of Inclusive Education* 2 (2): 119–34.

Buchler, Justin. 2009. "Teaching Quantitative Methodology to the Math Averse." *PS: Political Science & Politics* 42 (3): 527–30.

Buscemi, William I. 1997. "Numbers? Borrinnnggg!!!" *PS: Political Science & Politics* 30 (4): 737–42.

Campbell, Rosie and Sarah Childs. 2014. "Parents in Parliament: 'Where's Mum?'" *The Political Quarterly* 85 (4): 487–92.

Foster, Emma, Peter Kerr, Anthony Hopkins, Christopher Byrne, and Linda Ahall. 2013. "The Personal is not Political: At Least in the UK's Top Politics and IR Departments." *British Journal of Politics & International Relations* 15 (4): 566–85.

Harding, Sandra, ed. 1987. *Feminism and Methodology: Social Science Issues*. Bloomington: Indiana University Press.

Hesse-Biber, Sharlene Nagy and Patricia Lina Leavy, eds. 2007. *Feminist Research Practice: A Primer*. Thousand Oaks, CA: Sage.

Ho, Daniel E. and Mark G. Kelman. 2014. "Does Class Size Affect the Gender Gap? A Natural Experiment in Law." *The Journal of Legal Studies* 43 (2): 291–321.

Lovenduski, Joni. 1998. "Gendering Research in Political Science." *Annual Review of Political Science* 1: 333–56.

Matthes, Melissa. 2013. "Conclusion and Rejoinders." *Politics & Gender* 9 (2): 235–38.

Mendelberg, Tali, Christopher F. Karpowitz, and Nicholas Goedert. 2013. "Does Descriptive Representation Facilitate Women's Distinctive Voice? How Gender Composition and Decision Rules Affect Deliberation." *American Journal of Political Science* 58 (2): 291–306.

Metso, Milka and Nicky Le Feuvre. 2006. *Quantitative Methods for Analysing Gender, Ethnicity and Migration. Integrative Research Methods*. University of York. Online access, retrieved September 24th, 2015: http://www.york.ac.uk/res/researchintegration/Integrative_Research_Methods.htm

Morrison, Zoë, Mary Bourke, and Caroline Kelly. 2005. "'Stop Making It Such a Big Issue': Perceptions and Experiences of Gender Inequality by Undergraduates at a British University." *Women's Studies International Forum* 28 (2–3): 150–62.

Mügge, Liza M. ed. Symposium "Gender in European Political Science Education. Taking Stock and Future Directions." *European Political Science*. Forthcoming.

Olsen, Wendy K., Kingsley Purdam, and Reza Afkhami. 2009. "Gender Equality? Approaches and Quantitative Evidence Sources for Understanding the Circumstances of Men and Women in the UK". *Radical Statistics* 99: 12–33.

Onwuegbuzie, Anthony J. and Vicki A. Wilson. 2003. "Statistics Anxiety: Nature, Etiology, Antecedents, Effects, and Treatments—A Comprehensive Review of the Literature." *Teaching in Higher Education* 8 (2): 195–209.

Ryan, Matt, Clare Saunders, Emily Rainsford, and Emma Thompson. 2014. "Improving Research Methods Teaching and Learning in Politics and International Relations: A 'Reality Show' Approach." *Politics* 34 (1): 85–97.

Slootmaeckers, Koen, Bart Kerremans, and Johan Adriaensen. 2014. "Too Afraid to Learn: Attitudes towards Statistics as a Barrier to Learning Statistics and to Acquiring Quantitative Skills." *Politics* 34 (2): 191–200.

Spencer, Steven J., Claude M. Steele, and Diane M. Quinn. 2009. "Stereotype Threat and Women's Math Performance." *Journal of Experimental Social Psychology* 35 (1): 4–28.

Spierings, Niels. 2012. "The Inclusion of Quantitative Techniques and Diversity in the Mainstream of Feminist Research." *European Journal of Women's Studies* 19 (3): 331–47.

Weldon, S. Laurel. 2014. "Using Statistical Methods to Study Institutions." *Politics & Gender* 10 (4): 661–72.

Winn, Sandra. 1995. "Learning by Doing: Teaching Research Methods through Student Participation in a Commissioned Research Project." *Studies in Higher Education* 20 (2): 203–14.

https://doi.org/10.1017/S1049096516000962 Published online by Cambridge University Press