Selecting in or selecting out?
Gender gaps and political methodology in Europe

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Abstract: *Studies investigating gender gaps in the doctoral training of political science students have so far overwhelmingly focused on the US-context. While important research within this context has made strides in identifying the persistent challenges to women's incorporation in political methodology, much remains unknown about whether women and men have different experiences in methods' training during their PhD programs. We contribute to this debate by analyzing data from an original survey on the methods' training experiences of political science PhD students across different European universities. We aim to assess whether gender gaps exist with respect to PhD students' methods' training, and confidence in employing methods skills. Our findings show that women cover significantly fewer methods courses in their doctoral training. When women do participate in methods' training, they show similar levels of method employment as their male colleagues do. We discuss the implications of these findings in the context of European doctoral training.*

Introduction[**]

After building extensive bodies of literature to explain persistent gender gaps in politics and society, academics have turned to their own institutions. Recently, a number of studies have shed light on how gender biases continue to persist in academia, disadvantaging women from graduate school to tenured positions (Maliniak, Powers, and Walter 2013; Knobloch-Westerwick, Glynn, and Huge 2013; Dion, Sumner, and Mitchell 2018). Disparities accumulate, having implications for wages, promotions, and tenure. This means that the multiple dimensions of gender gaps also have consequences

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to women's overall presence in academia. Even though women represent roughly 40% of political science PhDs in the United States, they are still underrepresented in political science meetings and senior positions (Teele and Thelen 2017).

This underrepresentation is particularly pronounced in the subfield of political methodology. Women constitute less than 20% of the participants of the Society of Political Methodology (POLMETH) annual meeting (Barnes 2018), and are less likely to publish studies employing quantitative and computational methods (Teele and Thelen 2017) and to be lecturers in quantitative methods modules (Barnes 2018). In other words, if "political methodologists" can be understood as those who participate in the community (Esarey 2018) and have methods-centered teaching and research interests (Leeper 2018), then women are substantially underrepresented in this category. In fact, even when women employ the same methods as men, they are still less likely to characterize themselves as methodologists (Shannon 2014; Esarey 2018).

In examining the roots of the gender gap in political methodology, some scholars have pointed to a problem of self-selection: women tend to select out of courses that cover quantitative and computational methods due to reasons that emerge long before postgraduate school. Even though girls and boys tend to equally perform in math-related activities in elementary school, observable differences emerge in test scores in high school and college. Girls' and women's self-evaluations of their math-related qualifications also tend to be lower even when they outperform men (Morrow-Jones and Box-Steffensmeier 2014; Shannon 2014). Women's self-evaluations are reinforced by others, who tend to underestimate their work or deem it of lesser quality, even when identical to men's (Maliniak, Powers, and Walter 2013; Knobloch-Westerwick, Glynn, and Huge 2013).

Instead of remediating gender gaps in knowledge, however, doctoral programs seem to reinforce and perpetuate them, with impostor syndrome (Shannon 2014; Barnes 2018), discouragement (Morrow-Jones and Box-Steffensmeier 2014), and the perception of such environments as male-dominated and competitive (Shannon 2014) being frequently cited as reasons for pushing women away from quantitative and computational methods. Gender identification hereby intersects with other factors, such as race and sexuality (Puwar 2004; Gutierrez y Muhs et al. 2012).[i] However, as evidenced by established mentoring programs, such as the US-based Visions in Methodology (VIM) Conference, the CeMENT program by the American Economic Association, and the Journeys in World Politics Workshop at the University of Iowa, women-only environments that provide training, networking, mentorship, and access to role models have proved to be promising initiatives in tackling the gender gap in the discipline (Blau et al., 2010, Barnes and Beaulieu 2017; Barnes, Beaulieu, and Krupnikov 2014; Dion 2014; Barnes 2018). Our experience hosting the Zurich Summer School for Women in Political Methodology since 2017 provides further support for this.[ii]

Addressing women's underrepresentation in political methodology is crucial as being excluded from the field may have broader implications for women's careers—and for the discipline, more generally. While important strides have been made to identify the persistent challenges to women's incorporation in political methodology, much remains unknown about whether women and men have different experiences in methods' training during their PhD programs. Furthermore, studies on the topic have so far overwhelmingly focused on the US-context, so we do not know whether the patterns identified are also observed elsewhere. The question of generalizability is

especially important, because unlike in the US, where most departments require that students enroll and qualify in specific mandatory methods courses, many European programs do not require their PhDs to complete formal training (even though courses may still be available to PhD students).

We contribute to this debate by analyzing data from an original survey on the methods' training experiences of political science PhD students at European universities. Specifically, we use these data to assess whether gender gaps exist in respect to PhD students' methods' training and knowledge confidence.

1. Survey design, population, and sample

The study was designed to capture patterns and variation of the methods' training experience of political science PhD students in Europe (see Appendix A for the questions asked). One of the challenges in studying the profession is that the population of political scientists fluctuates and is largely unknown. In the United States, scholars have often used conference presentation (Barnes, Beaulieu, and Krupnikov 2014) or membership of the American Political Science Association (APSA) as a proxy for the population (Teele and Thelen 2017). Membership to the organization, however, incurs financial costs—something that might lead to the disproportionate underestimation of junior scholars and those with more limited conference allowances (our target group). Our focus on institutions in Europe, instead of a single country, posed yet an additional obstacle to estimating the population of political science PhD students.

To both be consistent with previous scholarship, as well as to overcome the aforementioned challenges, we first identified a list of institutions that sent participants

to the general conference of the European Political Science Association (EPSA) between 2011 and 2018. We chose to focus on EPSA because it has tended to attract scholars doing methodologically-oriented political science research. We therefore assume that our sample represents universities where political scientists display at least some interest in the training and application of quantitative and computational methods. Indeed, 55.6% of all respondents in our sample stated that their respective programs offered mandatory methods' training, a proportion that is likely to be significantly higher than across all PhD programs in Europe.

The list compiled included 232 institutions across 30 European countries.[iii] Not all institutions identified by EPSA attendance were universities or PhD-granting departments. To estimate our population of interest, we therefore manually accessed the websites of all 232 institutions in search for the names and email addresses of PhD students. This information was publicly available for 113 departments (48.7%), yielding a total contact list of 2,973 names.
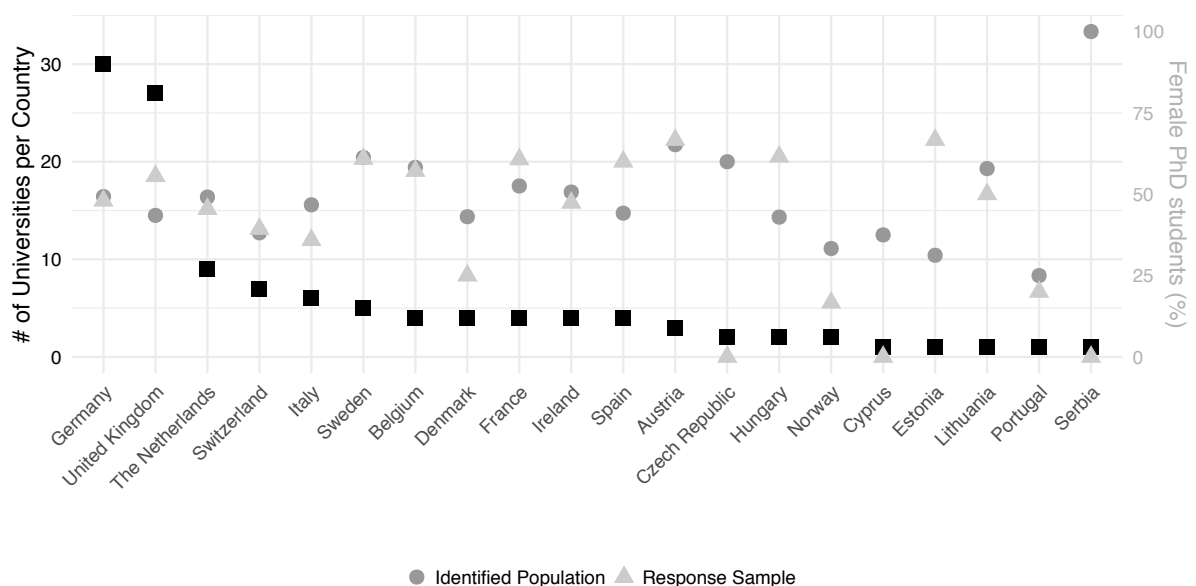

● Identified Population   ▲ Response Sample

Although incomplete,[iv] these data provide valuable insight into the cross-country variation in the gender-balance of the political science PhD population.[v] Figure 1 shows the distribution of students stemming from the 113 departments included in our list, located across 20 European countries. As the left y-axis shows, Germany and the United Kingdom are the countries with the largest number of institutions attending EPSA. In the same figure, the right y-axis shows the gender distribution in the identified population (dark gray dots) and our response sample (light gray pyramids). Overall, the identified population consists of 1,477 (51%) men and 1,344 (49%) women scholars. In most countries, the distribution of male and female PhD students is gender-balanced; yet, as the figure shows, there is some cross-country variation. For example, the Austrian and Hungarian institutions with EPSA attendance have more female than male PhD students, whereas the Swiss and Norwegian institutions identified have more male PhD students.

A total of 557 people completed the survey (20% response rate), but 75 were dropped for belonging to a discipline other than political science or not being a PhD student. This rendered a sample of 482 respondents, of which 233 (48%) are women.[vi] T-tests of differences in means confirm that women and men are not statistically different in respect to the size of the departments they attend, nor in regards to their age or having career plans to stay in academia—all aspects that could potentially impact one's methods' training experience. However, women in the sample were, on average, less likely than men to be in a department with a mandatory methods' training program (60% of women in our sample were in a department with a mandatory

methods' training program vis-á-vis 64% of men, a significant difference at the 5%-level). Moreover, women in the sample were, on average, further along in their PhD studies than men: 60% of female respondents were in their third year or more of their PhD study versus 46% of the men, a difference that is also statistically significant.

2. Findings

Methods' training

Scholars argue that one of the reasons for women's underrepresentation in political methodology is that they select out of math-heavy courses. We expect this pattern to be particularly strong in Europe: unlike in the United States, where most departments require that students enroll and qualify in specific mandatory methods courses, many European programs do not require their PhDs to complete formal training (even though courses may still be available to PhD students). In our sample, 38% of respondents are enrolled in departments that do not have a mandatory methods' training program.

To assess whether women's methods' training is different from that of men's, we presented respondents with a list of 21 topics and asked them to identify which ones they had covered during their postgraduate studies (see Figure 2).[vii] These topics were: descriptive statistics, linear regressions, multivariate regressions, bivariate regressions, time series, panel data, experimental research, survey design, text/context analysis, formal theory, Bayesian statistics, data visualization, multilevel modelling,

archival research, causal inference, elite interviews, agent-based modelling, machine learning, process tracing, maximum likelihood estimation, and survival analysis.

In a preliminary assessment of gender-based differences, we found that women are more likely than men to have completed qualitative methods' courses. Yet, our survey only included three types of methods that could be considered qualitative, so gender differences could be driven by the specific methods included. Overall, we found that women respondents covered a smaller share of topics. While, on average, men covered 40% of the topics from the list, women covered 31% of the topics, a difference of 9 percentage points that is statistically significant at the 1%-level.

Given our main interest in quantitative and computational methods, we restricted our further analyses to quantitative and computational methods only (18).[viii] For visualization purposes, we also grouped linear regressions, multivariate regressions, and bivariate regressions into a single category— "traditional regressions"—and time series, panel data, multilevel modelling, and maximum likelihood estimation into the category "MLE." This left us with a total of 11 topics.
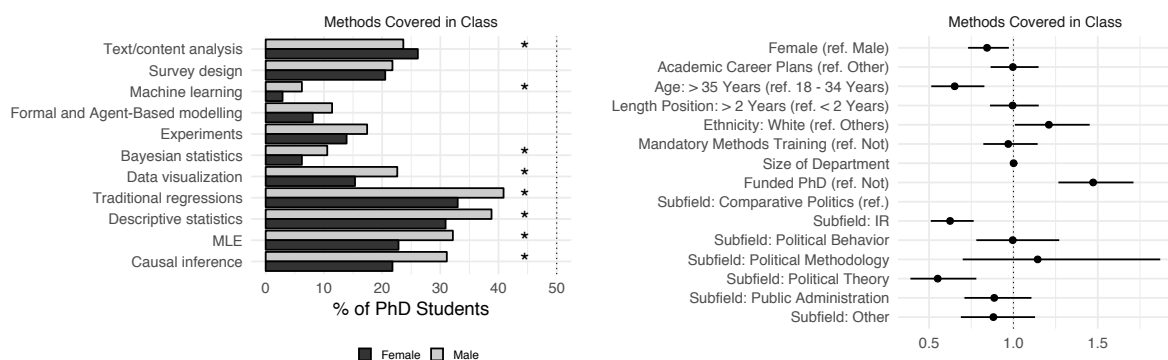

Figure 2. Topics covered in class.

Note: Left panel: topics covered by respondents' gender, * indicate statistically significant differences between male and female PhD students (at p<0.05). Right panel: Results from Negative Binomial regression models using country fixed-effects, reporting incidence-rate ratios.

The left-hand panel of Figure 2 displays gender differences for each topic analyzed. As indicated by the asterisks (i.e., statistically significant difference), 7 of 11 methods were covered by a lower share of women. To assess whether gender indeed accounts for differences in methods' training when controlling for other potential contributing factors, we estimated the share of quantitative topics covered out of the 18 quantitative topics, using a Negative Binomial regression model with country fixed-effects. Besides gender, we also accounted for: respondent's age, whether they self-identified as white or not, their career plans,[ix] whether their department offers mandatory methods' training during the PhD, receiving departmental funding (material or in kind), and sub-disciplinary focus (see Appendix B for the operationalization of the variables employed and the regression tables).

The coefficients presented at the right-hand panel of Figure 2 are incidence-rate ratios. These can be substantively interpreted as the ratio of odds A happening in the presence of B. As the figure shows, even when controlling for individual and department-specific factors, women's share of methods' coverage is 15 percentage points lower (coefficient of 0.85) than men's. Our results also show that self-identifying as white and receiving departmental funding have positive and statistically significant effects on the share of methods covered. As demonstrated, subfield also matters: compared to those focusing on Comparative Politics, respondents from the subfields of IR and Political Theory cover a lower share of quantitative methods.

Employment of methods

Impostor syndrome is also often cited as leading women to feel less confident in their skills, preventing them from employing knowledge they may have. We investigate

confidence by asking respondents to identify which topics they have previously employed in their research.

The left-hand panel of Figure 3 demonstrates that women are more likely than men to not have employed five quantitative techniques—traditional regressions, descriptive statistics, data visualization, survey design, and MLE—despite having learned them in class. These differences, however, are not statistically significant. Perhaps unexpectedly, as shown in the lower-part of the left-hand panel, women are *more likely than men* to employ six of the other quantitative techniques—experiments, machine learning, formal and agent-based modeling, text/content analysis, causal inference and Bayesian statistics—*if they covered the methods in class.* For causal inference and Bayesian statistics, these differences are statistically significant at respectively at 10% and 5% levels. These results suggest that, once women learn a method, they are not less likely than men to employ them—and, in fact, may be more likely to use them. In total, men stated to having previously employed 63% of the methods they learned in class in their own research, while women have used roughly 62% of methods learned—a difference that is not statistically significant.[x]
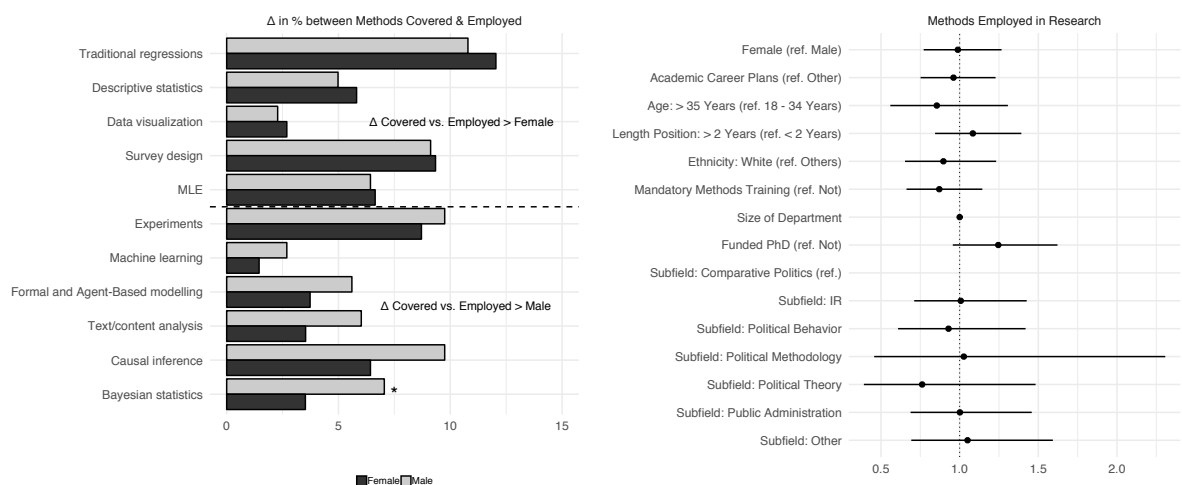

Figure 3. Topics employed in research.

Note: Left-hand panel, differences between methods covered and employed in percentages by respondents' gender. * indicate statistically significant differences at p<0.05, ** indicate statistically significant differences at p<0.10. *Results from Negative Binomial regression models using country fixed-effects, reporting incidence-rate ratios.*

As before, we also employ a Negative Binomial regression model with country fixed-effects to examine whether gender shapes respondents' levels of methods' employment, when controlling for other individual and department-level characteristics. The right-hand panel of Figure 3 summarizes these results. As shown, no discernible gender differences emerge. Across the different institutional and individual level determinants, we also found no discernable factors that shape variation in level of method employment. For instance, doctoral students in non-funded PhD programs seem, in general, less inclined to employ quantitative methods—but not statistically significantly so.

Overall, our findings suggest that gendered differences in terms of method employment may not be as substantive as previously thought: both descriptive and multivariate results indicate that respondents' gender cannot explain variation when it comes to the *employment* of quantitative methods in research. In other words, our findings suggest that although women may not *seek out* methods' training to the same extent as others, once they have learned the methods, they seem to employ them at similar rates.

3. Conclusion

In this paper, we offer a brief analysis of recently collected data from a survey on the methods' training experience of political science PhD students from 20 European countries. Using these data, our aim was to understand whether and how the methods'

training experiences of men and women differ. As per the existing literature, gender gaps in methods' training can have broader consequences to academic careers. Our respondents concur, with both men and women perceiving having knowledge of quantitative methods as *more* important for their career progression and opportunities than expertise in qualitative methods.

Yet, when analyzing PhD students' training and employment of quantitative and computational methods, we found that, on average, women have covered fewer topics than men. This reinforces previous research that find gender imbalances in political methodology. Perhaps more optimistically than existing work, however, we also found that women and men employ quantitative methods at similar rates—once they cover them in class. This suggests that an important factor of the previously identified gender gap in methods may be in women's and men's *different levels of exposure to a larger variety of topics*. Moreover, it is possible, as other studies suggest, that the *types* of methods covered by men and women are still different. In other words, while aggregate levels of confidence reported may not be different, a more detailed analysis may show a gender gap in respondents' levels of confidence in employing specific topics.

Overall, our results are encouraging in that they indicate that when women PhD students are exposed to methods in class, they become as likely as their male colleagues to employ them. However, given the structure (or lack thereof) of European doctoral programs, women currently cover significantly fewer methods throughout their training. Our limited data on qualitative methods further suggest that women are also more likely to select into training of qualitative methods' topics, which tends to not feature as prominently in students' curricula.

We contend that there are concrete implications to be drawn from these results. Departments that wish to prepare their students for both the academic and non-academic job markets should pay attention to creating course offerings that reflect their doctoral students' methods needs and interests in a gender-balanced way–including both quantitative and qualitative course offerings, or providing support for students to take part in such course through external training.

Second, if we aim to achieve gender balance in political methodology, methods' trainings should be offered in a way that encourages women doctoral students to participate early and often. This is especially important given that quantitative skills are currently highly valued in the discipline (Teele and Thelen 2017), a perception that our survey respondents also share. Ensuring that women do not select out of quantitative and computational methods early on in their careers could ensure that they continue to comfortably employ these methods later on—helping to eradicate (or, at least, begin to close)[xi] gender gaps in the profession down the line.

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[i] The report on "Diversity and Inclusion in the Society for Political Methodology" showed that 80% of all members of PolMeth are non-Hispanic white, and 76% of all APSA members fall in that category as well.

[ii] For more information about the program, see: http://www.zurichsummerschool.com.

[iii] To examine whether our list encompassed all major political science departments in Europe, we compared it to membership to the European Consortium for Political Research (ECPR). The ECPR has exactly the same number of European member institutions as EPSA (232), 136 of which (approximately 60%) are also EPSA members. In other words, 60% of our identified population is a member of the two major European political science associations. Additionally, we account for 96 institutions that have sent representatives to EPSA but are not members of ECPR—and exclude 96 institutions that are members of ECPR, but have not taken part in EPSA conferences. Information on ECPR membership was retrieved from https://ecpr.eu/Membership/CurrentMembers.aspx on 21/02/2019.

[iv] We were able to retrieve information about PhD students from 48% of the institutions in our initial list. While many of the institutions not included do not grant PhDs, we are also likely not accounting for students in departments that do not list students on their websites. The number of PhD students also fluctuates, so it is possible that we failed to contact students who had not yet been added to the websites (or contacted individuals who have already left the program). We also know that our list of contacts mis-specified some individuals who were PhD students in social science departments, but not political scientists.

[v] We used the R package *gender* to encode the predicted sex of each individual in the population based on their first names (Mullen 2018).

[vi] Using the online survey platform Qualtrics, we recruited participants via email between 31 June and 25 August 2018. The questionnaire had 26 questions and took approximately 10 minutes to be completed. As an inducement for participation, we raffled an Amazon voucher of 50 Euros.

[vii] While the list did include some qualitative methods, it purposefully displayed a majority of topics that would be covered in quantitative and computational methods courses. Including an exhaustive list of topics would not have been feasible, so we also allowed respondents to provide information about additional topics they learned. We do not analyze this information in detail in the current article.

[viii] We exclude archival research, elite interviews, and process tracing.

[ix] Operationalized as "Staying in academia" versus "leaving academia" or "not knowing yet".

[x] Similarly, when asked about their levels of confidence in their knowledge of the topics, women and men in our sample identified they would be "somewhat comfortable" or "very comfortable" in employing 57% and 59% of the methods they learned (respectively).

[xi] Explicit encouragement does not directly address larger challenges related to implicit biases that affect what fields women end up working in, and what departments will hire them. However, it may offer a first step towards building a network of women working on questions to related to political methodology in Europe, which may ultimately help address more systemic issues in the discipline.