Blending in or standing out? Gendered political communication in 24 democracies

Bruno Castanho Silva[*]
Freie Universität Berlin

Danielle Pullan
University of Cologne and
Max Planck Institute for
the Study of Societies

Jens Wäckerle
University of Cologne

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Abstract

Women in male-dominated organizations often must adopt more stereotypical masculine traits to advance within those hierarchies. While politics, historically male-dominated, should induce women to blend in, increasing numbers of women in parliaments may give women the opportunity to stand out by not adopting masculine style. This paper investigates how these contradictory incentives influence women Members of Parliament (MPs) in 24 democracies between 1987 and 2022, applying machine learning to 7.4 million parliamentary speeches to measure how feminine is their speaking style. Findings indicate a socialization effect, whereby women adopt a more masculine style the longer they stay in office, even after controlling for their speeches' topics. The effect is strongest for women in socially progressive parties. This research highlights the role of parliaments as gendered workplaces which still lead women to adapt to the male norm, and helps us understand the incentives that shape how women represent women in parliament.

Keywords: Women in politics; legislative politics; text analysis; machine learning; political style

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Israeli Prime Minister David Ben Gurion is credited as calling Golda Meir, his Labour and Foreign Affairs minister (and later PM herself), *"the only man in my cabinet"*. This quote captures the essence of what many people still today, consciously or not, connect to competent leadership: being a man. Stereotypes of a good leader associate it with an agentic or autocratic style that people more readily see in men (Eagly and Johannesen-Schmidt, 2002), and which men do seem more prone to embrace (Koenig et al., 2011), regardless of whether that actually constitutes better leadership or not. As Schein (1973) put it, when people "think manager", they tend to "think male". These perceptions create a strong incentive for women who want to succeed in a male-dominated environment or organization to adopt a more stereotypical masculine style. Women who rise to top positions in organizations tend to describe themselves in more masculine terms and distance themselves from women colleagues (Derks, Ellemers, van Laar and de Groot, 2011; Derks, van Laar, Ellemers and de Groot, 2011; Ellemers et al., 2004).

Politics, a male-dominated environment for centuries in almost every country, should in principle be no exception to this trend. For instance, women still often have to deal with harassment and sexism (O'Brien and Piscopo, 2019; Krook, 2018). However, different from other types of organization, politics comes with unique incentives and pressures that might push women towards staying distinct from men: they are more likely to speak about different issues from men (Bäck, Debus and Müller, 2014; Mendelberg, Karpowitz and Goedert, 2014), and are electorally rewarded for representing women citizens (Bergqvist, Bjarnegård and Zetterberg, 2018; Bailer et al., 2022).

In this paper we ask how these two contradictory incentives play out during women's political careers, by focusing on their speaking style in parliament. Do women speak in a way more similar to men the longer they stay in office, thus adopting a more masculine style that makes it theoretically easier to attain top leadership positions? Is this a socialization effect or a selection effect? And how does it vary across different types of parties?

To answer these questions, we collected one of the most comprehensive comparative datasets of parliamentary speeches to date in political research, including 7.4 million

speeches from twenty-four countries in Europe (East and West), North America, and Oceania between 1987 and 2022. We use a machine learning approach to inductively obtain a measure of how feminine or masculine the discourse of each MP is, based on their speeches, which allows us to see if and how women MPs change their speaking style, in relation to its genderedness, as their parliamentary careers progress. This improves upon previous techniques for measuring gendered speech based on deductive ideas about what makes something "masculine" or "feminine". Rather than applying a set criteria of what constitutes masculinity and femininity in political debate, we observe these concepts and understand them as the expressions of men and women respectively.

Our findings show that women adopt more masculine language the longer they stay in parliament. Part of this effect is due to speaking more about topics traditionally considered to be more masculine, or more dominated by men, such as finance and defense, which are also associated with higher political prestige (as seen in Wäckerle and Castanho Silva, 2023). However, a significant part is due to adopting a speaking style more similar to that of men in parliament over time. Moreover, findings indicate this is not a selection issue, whereby women with more masculine styles would have longer careers, but rather that women shift towards a more masculine style the longer they stay in office, indicating they are socializing into that male-dominated workplace. Findings also suggest that women in more conservative parties continue to have a more distinctively feminine speaking tone during their tenure, while the most change in speaking style is seen among those in more progressive parties, suggesting that women in right-of-center parties tend more to stick to distinctive gender stereotypes. Taken together, these results indicate that while women do speak differently from their male counterparts, this difference decreases the further they progress in their careers, similar to what is seen with the behavior of women who reach high positions in other male-dominated organizations.

Women Rising in Male-Dominated Environments

Parliaments are gendered workplaces (O'Brien and Piscopo, 2019), with sets of formal and informal rules which have been set by-and-large by generations of men who dominated these houses across the democratic world, often resulting in less speaking time for women (Osnabrügge, 2021; Bäck and Debus, 2019). More than that, the workplace dynamics in parliaments are still more hostile to women than men even in countries close to achieving parity in representation, such as Sweden: Erikson and Josefsson (2019) find that women in the Riksdag experience more pressure, anxiety, and negative treatment than their male colleagues. The phenomenon of violence against women in politics is global, and it includes a variety of threats to women's safety and ability to lead such as physical violence, sexual violence, psychological violence in the form of death and rape threats and stalking, sabotaging the campaigns of women candidates, and symbolic violence such as creating sexualized images of women politicians online (Krook, 2017; Baker, 2021).

Legislatures around the world operate under rules made by men, and historically these institutions only included men, which result in structural biases against women MPs today (Duerst-Lahti, 2005; Lovenduski, 2005; Galea and Gaweda, 2018). Collier and Raney (2018) describe the "myth of neutrality" as applied to parliaments, whereby institutions that are supposedly neutral in fact enforce standards that benefit the socially dominant white, straight, cisgender, wealthy, well-educated men. The gendered nature of these institutional features can be difficult to observe because of the myth of neutrality, but Lovenduski (2015, p.22) developed an exhaustive list of ways women MPs could learn to work with existing rules and also change rules to make the gendered workplace of parliament more friendly to feminine styles, including campaigning to include women in ministries and committees, establishing new ministries and committees dedicated to women's issues, changing the rules to ensure that more women are selected as candidates, and institutionally requiring men to yield speaking time and space on the agenda to women (Lovenduski, 2015).

Given the under-representation of women in parliament and leadership positions, along with these examples of structural discrimination against the women who are there,

it is fair to say that parliaments around the world are male-dominated hierarchies. As such, it is reasonable to expect that behavior and leadership styles which are more rewarded are those more stereotypically associated with, and performed by, men. Across domains, Eagly and Johannesen-Schmidt (2002) review a variety of typologies of leadership styles, and find that both in terms of stereotypes and observational data, women leaders are more often associated with interpersonal and democratic leadership styles, whereas men are more associated with task-oriented and autocratic leadership. Eagly and Karau (2002) expand this to show how women's leadership styles contribute to them being perceived as poor leaders.

The tendency towards more collaborative work is also seen among women in politics. Across countries, women have been observed to be less adversarial than men (Childs, 2004; Grey et al., 2002; Sones, Moran and Lovenduski, 2005), and to engage more in bill cosponsorship and collaboration (Barnes, 2016; Holman and Mahoney, 2018; Wäckerle, 2023). These characteristics have led Adams et al. (2023) to argue that a higher presence of women in politics have the potential to reduce affective polarization among the public. However, when women act more collaboratively, they are not conforming with what people believe to be good leadership. Women thus face a double bind: if they lead in a more stereotypically masculine way, then they are judged poorly for not conforming to their prescribed gender roles, but if they lead in a feminine way, they are seen as poor leaders (Kawakami, White and Langer, 2000; Rincker, 2009; Rosenwasser and Dean, 1989). As Duerst-Lahti (2005, p. 234) summarizes: "Even when women win a place in the institutions, they are faced with a Catch-22 dilemma: they can perform the masculine better than males and in the process reinforce the masculinist preferences that make it hard for them to succeed, or they can remain outsiders and face enormous challenges to being effective."

Organizational behavior theory has even coined the "queen bee syndrome" phenomenon (Staines, Tavris and Jayaratne, 1974) for the theory suggesting that women leaders perceive that there is only limited room at the top of their organization for women, and in order to ensure that they protect their own positions, these women engage in increased

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gender stereotyping of their colleagues who are women and describe themselves in more masculine terms. Evidence of the queen bee phenomenon has been found among women corporate leaders (Derks, Ellemers, van Laar and de Groot, 2011), policewomen (Derks, van Laar, Ellemers and de Groot, 2011), and women in academia (Ellemers et al., 2004). Derks, van Laar and Ellemers (2016) further theorize that this phenomenon is a response to gender discrimination rather than the source of gender discrimination. They argue that women leaders are assimilating into an organization's masculine culture. This runs contrary to what advocates of descriptive representation hope diversity will bring to leadership, namely the inclusion of diverse perspectives and styles. There has only been limited application of the queen bee theory to women in politics: Arvate, Galilea and Todescat (2018) did not find evidence for it in their analysis of mayoral appointments to public organization in Brazilian municipalities which did or did not elect women in 2000 and 2004: more women were promoted in municipalities where women won than in those led by a male mayor. However, O'Brien et al. (2015) show that women-led governments nominate fewer women ministers, especially compared to left-wing governments led by men.

Spending time in parliament thus may have a socializing effect that leads women to comport themselves with the institution's social norms – for example, Chaudhuri et al. (2022) find that women new to politics are less likely to engage in corruption than men in India, but that this difference is entirely explained by their smaller political networks and that, as women get more socialized into politics the longer they stay in office, gender gaps in corruption disappear. Bailer et al. (2022) find that MPs are less likely to substantively represent their social group the longer they are in parliament. Furthermore, those who wish to rise through party and parliamentary ranks may see themselves forced to adopt more masculine traits that are expected from leaders in such a gendered institution.

Speech as Acting in Politics

The arguments outlined so far discuss masculine and feminine style in behavior and leadership. There could be different ways to observe whether women adopt a more masculine

style during their political careers. For example, one marker of style is clothing, but in several parliaments that is highly formalized. Another is observing cooperative behavior, generally more ascribed to women's style, (e.g. Barnes, 2016; Holman and Mahoney, 2018; Swift and VanderMolen, 2021). However, bill cosponsorship is not practiced in every parliament, meaning it might be very difficult to observe cooperation in some countries.

One crucial element of style, ever present in politics, is language. No matter the time and place, politicians speak. Their speech is used to send a message to peers and voters alike, communicating the style they would like the world to see them in. Indeed, studies of parliamentary speech across countries have found differences in grammar use between men and women, which mirror stylistic speaking differences among the general population (e.g. Yu, 2014). Women have been found to use more positive and affective language in parliament in the UK and Germany (Boussalis et al., 2021; Childs, 2004; Hargrave and Blumenau, 2021), and to express more emotion in particular when talking about women's issues (Dietrich, Hayes and O'Brien, 2019).

Without prejudice to this literature, in this study we avoid making deductive assumptions about what types of words, topics of discussion, or styles of speaking are more "masculine" or "feminine". We do not presume to criticize the entire canon of literature that studies gendered political behavior based on such assumptions, but we argue that technological advancements have enabled the models we describe below to allow us to further develop a nuanced understanding of these topics. What we the authors consider to be masculine or feminine behavior is inextricably tied to our personal experiences, worldviews, as our positionality. In studying women MPs comparatively, we must move beyond our own cultural understandings of gender performance and consider that definitions of masculinity and femininity will vary in different cultural and political contexts. Thus, to be clear, when we describe something as "masculine" or "feminine", we base this in the data about what men or women do and say. We do not have a preconceived notion of certain words, topics, or behaviors as inherently more aligned with one gender than the other, but rather we allow our data to define genderedness.

Wäckerle and Castanho Silva (2023) summarize the main reasons why women have

different speaking style from men according to the literature: firstly, as girls are social-ized differently than boys, gender-specific behavior is learned from parents and in schools (Ruble, Martin and Berenbaum, 2007; Kollmayer, Schober and Spiel, 2018). When these girls grow up and pursue careers in politics, they then enter the gendered workplace described above (O'Brien and Piscopo, 2019). This means that women have a funda-mentally different work environment than men, which affects the way they behave and speak (Krook and Mackay, 2011). Relatedly, this also leads to women speaking less often in parliaments (Bäck and Debus, 2019) and speaking about different topics than men, so-called "women's issues" such as health care, education and family (Bäck, Debus and Müller, 2014).

Therefore, if women MPs see an incentive to showcase a more masculine style to further their careers, we should expect to observe that reflected in the style they use when speaking, with those that have longer careers or progress further using a speech style more similar to men than other women MPs. This would lead us to expect that:

Hypothesis 1 *Women MPs will have a more masculine speaking style the longer they stay in office.*

Perhaps women who stay longer in parliament are systematically different and, from the start, have a more masculine style than those who stay for shorter tenures. Such arguments have been tested in discussions of the gender pay gap: some suggest that the gap is in part due to women selecting traditionally feminine jobs that are paid less than traditionally masculine jobs. US Census bureau data demonstrates that this is not true – gender pay gaps exist even when controlling for occupation, work experience, education level, and more – but the mythology persists (Schieder and Gould, 2016). But could it be true that more feminine traits or more masculine traits are rewarded with different levels of success, depending on the job?

It could be argued that being a parliamentarian is an "extreme job" following Gas-coigne, Parry and Buchanan (2015)'s definition. As the authors argue, extreme jobs and the related concept of the "ideal worker" are both gendered concepts. Jobs that require long hours and working on weekends, as parliaments can, leave little time for family

caregiving responsibilities, rooted in the patriarchal norm of a male breadwinner with a stay-at-home wife. An ideal worker puts their job first and their personal identities and priorities second. This sort of job is simply not appealing to many women (Barbulescu and Bidwell, 2013), in particular those who are parents, as it is well-documented that women are held responsible for a disproportionate share of social reproduction work (Folbre, 2021, ch. 4) and domestic labor (Jaffe, 2021, ch. 2). Women MPs are aware of the ways in which parliamentary rules suit men and masculine norms, noting that long working hours and evening meetings held off-site put them in a double bind: either they can attend and be dedicated workers, but they also might be seen in a more sexual way for being available in the evening, or they skip the meeting and lose standing in their colleagues' eyes (Franceschet and Piscopo, 2008, p. 417).

So perhaps those women who do pursue and succeed in a parliamentary career differ from their peers in ways that allow them to better conform to the "ideal worker" stereotype, e.g. by being able to hire domestic help or having family support, or by not having children. Perhaps the women who enjoy long parliamentary careers simply have a different temperament and style than other women MPs, and this explains their success. The selection hypothesis thus is:

Hypothesis 2 *Women MPs who will come to have long parliamentary careers have a more masculine speaking style throughout their time in office than those who have short careers.*

Not all parties see women the same way

Naturally, the gendered effects on political career progression are also influenced by parties. Generally, femininity is not evaluated as a positive trait for conservatives. Bernhard (2021) surveyed voters in the US 2016 election and found that while Democrats, liberals, and women of any party evaluated candidates more favorably when they were described as having feminine leadership styles, Republicans, conservatives, and Trump voters evaluated those candidates less favorably. Similarly, King and Matland (2003) found that among hypothetical candidates who had identical descriptions including Republican party

membership but where the candidate's gender was varied, Republicans were less likely to trust or vote for the female candidate than an identical male candidate profile. Bauer (2020) found that women candidates have less support in Republican primary elections because the Republican party is stereotyped as masculine and the Democratic party is stereotyped as feminine. There is a clear division between Democrats' and Republicans' evaluations of femininity: Democrats see it as a positive trait, whereas Republicans see it as a negative one. Outside the US, O'Neill and Stewart (2009) find evidence that left-wing parties in Canada are more likely to elect women to be party leaders. Kittilson (2006) studies Western Europe, particularly focusing on the UK, Germany, and Finland, and also observes a similar trend.

However, while preferences for female and male candidates may seem to indicate that left-of-center parties see women more favorably, when it comes to stereotypical masculine or feminine style and appearance the picture changes. By using software to measure how typically masculine men's faces were and how typically feminine women's faces were, Carpinella and Johnson (2013) found that regardless of party, women members of Congress had more sex-typical faces than their male counterparts, and that the phenomenon was even stronger when considering only Republicans. Boussalis et al. (2021) also look at the physicality of politicians in Germany, observing the nonverbal emotional communication during election debates. They find that the conservative candidate and chancellor Angela Merkel expresses less anger than male party leaders, mainly from the political left, and that when Merkel does express anger, voters punish her party for Merkel's gender-incongruent performance. Overall, these findings suggest that while conservative parties are less likely to elect women, they also prefer that the women in their party physically look particularly feminine and act in a "feminine" way.

These preferences would indicate that women in conservative parties may have a stronger pull from their electorates to retain a feminine style. If more socially conservative voters prefer women who behave in a more feminine way, success for them would ultimately dictate maintaining that style rather than socializing into a masculine environment. This leads us to the third hypothesis tested in this paper:

Hypothesis 3 *Women MPs from socially progressive parties adopt a more masculine speaking style during their time in office than women MPs from conservative parties.*

MPs and Speech data

To answer the questions raised, we compiled one of the most comprehensive datasets of parliamentary speeches seen to date in political research. It includes 7,410,299 speeches delivered between 1987 and 2022 in the parliaments of twenty four countries from Europe, Oceania, and North America. Only by looking at a large number of countries for such a long period is it possible to observe general trends in the evolution of women's style over the course of their political careers. Crucially, this study also expands our knowledge of gender and political speech to many countries that have not been covered by such analyses before, for example in Eastern Europe. Figure 1 gives an overview of all countries and the period covered for each. The sources for speeches are the following: Austria, Czechia, Denmark, Germany, the Netherlands, New Zealand, Spain, Sweden and the UK from the Parlspeech v2 dataset (Rauh and Schwalbach, 2020); Finland from the Parlspeech dataset (Rauh, De Wilde and Schwalbach, 2017); Belgium and Portugal from the MAPLE dataset (Kartalis and Costa Lobo, 2021), Greece from Dritsa and Louridas (2018); Norway from Lapponi et al. (2018); Iceland from Steingrímsson, Barkarson and Örnólfsson (2020); Slovenia from Pančur et al. (2020); Poland from Ogrodniczuk and Nitoń (2020); Latvia from Darǵis et al. (2018); Switzerland from Zumbach (2019); and US from Gentzkow, Shapiro and Taddy (2019); Ireland and Italy we scraped directly from the Parliament homepages[1]; and Estonia and Romania were graciously shared by colleagues (Martin Mölder and Claudiu Tufiș) who collected the parliamentary speech record in those countries for their projects.

With the exception of the US Senate, all speeches in the database are delivered in the lower houses of parliament. Moreover, we use only speeches from plenary sessions, in order to keep comparability across countries, and avoiding using speeches e.g. in parliamentary commissions which are only available in some legislatures. Only speeches

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[1]https://api.oireachtas.ie/ and https://dati.camera.it/it/download respectively.

longer than 50 words are kept, to remove interjections and questions which might carry little substantive information. Furthermore, we only keep speeches from sitting members of that house of parliament, removing speeches by the Chair (also named House Speaker, President, and so on in different countries), which oftentimes are only procedural and do not get involved in policy making or position-taking, or from cabinet members who are not MPs. To the best of our knowledge, the speech corpus from every legislature is based on stenographic records kept by the legislative bodies themselves, and thus should contain all speeches delivered in those chambers. It includes speeches by 25,002 unique speakers belonging to 533 parties.

Figure 1: Parliamentary Speeches across countries over time
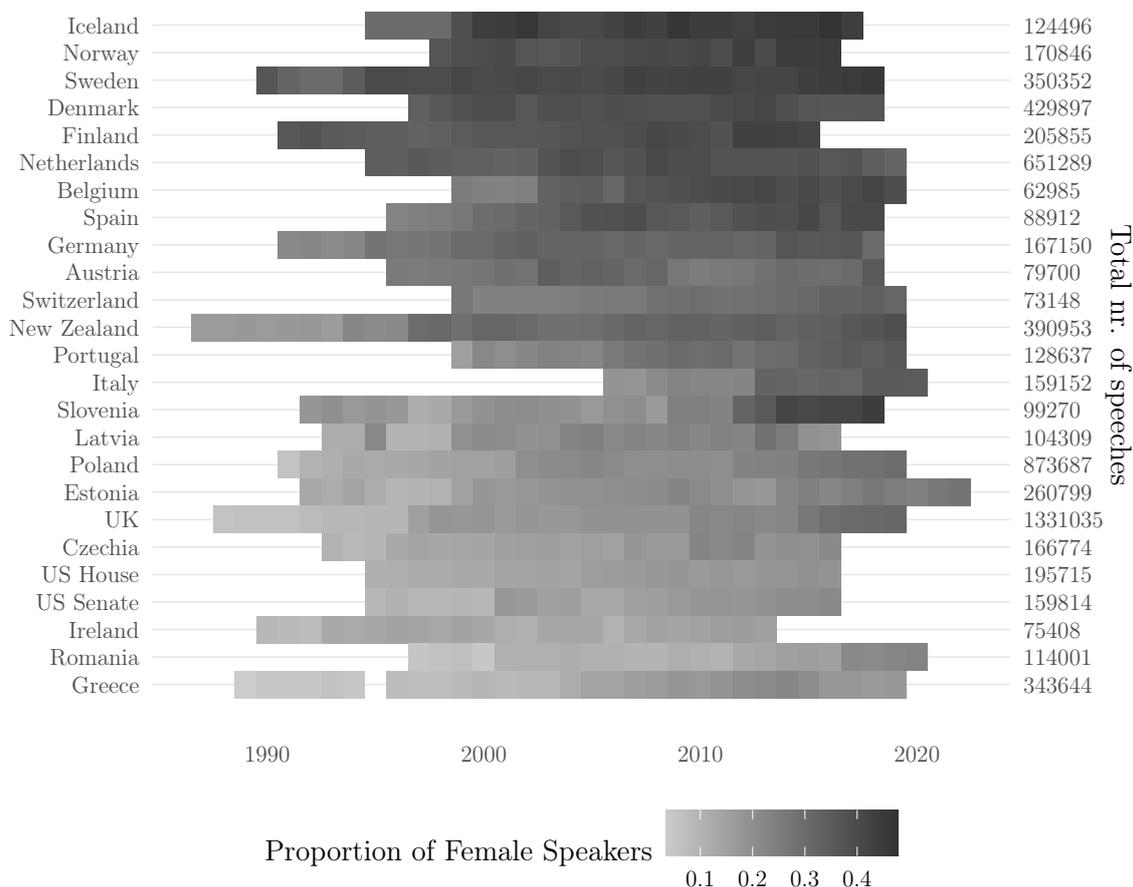
The most important variable in this design is of course MPs' gender. In some corpora, this is part of the metadata given along with the speeches (Norway, US, Greece), or each speech starts with a gendered identifier of the speaker such as "Mr." or "Ms./Mrs." (Ro-

mania, Ireland). For others we relied on the Comparative Legislator Database (Austria, Czechia, Finland, Germany, Spain, UK: Göbel and Munzert, 2020). For the remainder we manually classified all MPs based on either the everypolitician.org database or their Wikipedia or parliament website profiles.

We recognize that gender is a spectrum and not a simple binary, and our conceptualization of speeches ranging on a continuum from more feminine to more masculine supports this. There are three transgender MPs in the dataset – Vladimir Luxuria in Italy, Georgina Beyer in New Zealand, and Anna Grodzka in Poland – and for all three we made sure their gender identity was recorded and not their sex assigned at birth. We are not aware of any nonbinary legislators serving in the countries and years included in our dataset. Future studies should consider how trans, nonbinary, and gender-nonconforming speech may differ from cisgender legislators' speech, but at this time there is not sufficient data for this analysis.[2]

The shades in Figure 1 show the proportion of women speakers in each parliament by year. As made clear by the upper limit of the legend, there is not a single year in any of the twenty four countries where women gave at least 50% of the speeches. As known from comparative studies, the Nordic countries are those closer to reaching parity, while others such as Ireland, US, or Greece lag behind with fewer than 20% of most sessions of parliament being composed of women. The reason there is variation within a single legislative period in a legislature is that not every MP speaks every year, and there are small changes to the composition every year due to MPs being replaced off normal election cycles.

Measuring Gendered Language

We follow Wäckerle and Castanho Silva (2023) in their approach of using machine learning to measure gendered language in political text. In lay terms, this is a model which reads the text of the speech and knows the gender of the speaker. It uses that information to

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[2]We are aware of at least three more trans legislators who have taken office at the time of writing, but after the period of our data ends.

learn what distinguishes the ways in which women and men typically speak within each legislature in each given year. Once it has done that, we then ask the model to predict the gender of the speaker of each speech. The statistical model reports a predicted probability, reflecting how confident it is that the speaker is a man or a woman. Following Wäckerle and Castanho Silva (2023), we interpret this as a measure of "how feminine/masculine" the speaker is. If the model is very confident a speaker is a woman, that means that speech has language very similar to how other women speak in that place and time; a very low predicted probability of it being a woman, conversely, means the model is very certain the speaker is a man, meaning the speech has language similar to that typically used by men in that legislature and year. These predicted probabilities, one for each speech, are what we call *speech femininity* – the higher the value, the more a speech is using language distinctively associated with how women speak; conversely, the lower the value, the more a speech is using language distinctively associated with how men speak.

More specifically, we fit two types of machine learning models to the data, an XGBoost algorithm for boosted decision trees (Chen and Guestrin, 2016) and a binomial regression with Ridge regularization (James et al., 2013). The level of observation is the speech, and the outcome variable being predicted is whether the speaker is a woman (1) or not (0). The predictive features are the word frequencies in speeches.[3] The corpus for each legislature is divided by year, and both the XGBoost and Ridge regression are fit on all speeches of that legislature in that year.[4]

All countries and years start with the same model specifications: for the Ridge regression, we use a binomial family and 10-fold cross validation to select the value of λ which gives the lowest cross-validated estimate of the test-set error rate for that legislature-year. For the XGBoost algorithm, we use an η of .3, maximum depth of 5 nodes for each deci-

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[3]We use a bag-of-words assumption and only unigrams, since they already give high accuracy across the majority of cases. Regarding pre-processing, we do not stem the words because they may carry important information: for example, in Spanish if a woman says "nosotras" she is explicitly saying "we, women", and this carries substantive information which would be lost if we stemmed the pronoun to "nosotr", merging with the masculine and traditionally used as neutral or for mixed groups "nosotros".

[4]Models are fit within legislative sessions, meaning that if a new session started during a year, this year is also split into before and after the new MPs take office, and models fit separately in each. Periods with fewer than 500 speeches are excluded.

sion tree, and fit a maximum of 150 trees,[5] with a binary logistic objective function. Both types of models use regression weights which are the inverse proportion of women in that legislative term. The training-set thus is the entire corpus of the respective legislature-year. Once each model is fit, we extract the predicted probability attributed to each speech in that model that it was given by a woman, and take the average between the XGBoost and the Ridge regression probabilities as an ensemble.[6] These ensemble predicted probabilities are our measure of speech femininity – the higher it is (i.e., closer to 1), the more that speech is using language that is strongly related to how women speak in that context, making it easier for the classifier to tell its speaker is a woman. The lower that value (i.e., the closer to 0), the more that language is similar to the language used by men in that context.[7]

The first main advantage of this approach is in giving us a continuous measure of femininity for each speech, which varies within speakers. Since each speech has a femininity measure spanning from 0 to 1, it is possible to observe if and how each MP's rhetoric changes over time or across topics. The second great advantage is its inductive character: rather than defining beforehand what characterizes rhetoric as masculine or feminine and then measuring it, we use an agnostic model to identify the words most predictive of women's speech in relation to men (and vice-versa), which are naturally changing across space and time.[8] This allows for a study that is comparable across a large sample while still respecting contextual differences.

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[5]For Poland and the UK, which have the highest number of speeches, these hyperparameters are not enough to get good accuracy, which is the reason why we run a maximum of 200 trees.

[6]Both classifiers have similarly high accuracy, as shown in the Online Appendix through both the F1 score and Area Under the Curve (AUC), reason why we take an ensemble for all.

[7]We use the training-set predictions because our goal here is not to build a model that can accurately predict women's speeches out-of-sample, but rather to accurately identify the differences between how men and women speak in parliament in the data at hand. While there is an argument in favor of using out-of-sample predicted probabilities, Wäckerle and Castanho Silva (2023) show that both give similar results as a measure of speech femininity.

[8]Quantitative studies of gendered differences in parliamentary speech have used a deductive approach (e.g. Boussalis et al., 2021; Hargrave and Blumenau, 2021; Yu, 2014). This means pre-defining masculine or feminine style markers such as negativity/positivity or collaborative/adversarial language, and then looking at whether men's and women's speeches varied along those dimensions. These approaches have merit but are very limited for comparative analysis spanning two dozen countries and four decades. It is very difficult for a researcher to establish what should constitute masculine or feminine language and style across all cases: are women really speaking more positively both in Estonia 1994 and New Zealand 2019, or men using more nouns in English, Slovenian, and Finnish alike? Moreover, there are no available dictionaries for such categories in all languages in this study.

We conceptually validate this measure in Online Appendix E. There, we use the Linguistic Inquiry Word Count dictionary (LIWC Pennebaker et al., 2015) in the languages of interest for which it is available, and regress the speech femininity variable on a number of linguistic features whose usage is supposed to vary across men and women both in general and in politics. The analysis shows that more feminine speech is characterized by expressing more positive sentiment and referring more to social relations, while masculine speech contains more negative emotions. This replicates the analysis in Wäckerle and Castanho Silva (2023), who proposed and validated extensively this approach in five West European parliaments. They show that speech femininity measured through machine learning captures both elements of linguistic features and also substance – meaning, different topics being spoken about by men and women in parliament.

This measure makes no qualitative judgements as to what is more masculine or feminine speech in any given time and place. We let the model decide, purely based on speeches given, what words are more associated with men's speech, and which ones are more associated with women's discourse. The degree of femininity in speech, therefore, is relational: in that legislative period, how much more (or less) distinctively are women speaking in comparison to men? When we describe something as "masculine" or "feminine" in this analysis, this is the sense in which we mean it – typical of men or women in our dataset. We use the terms "feminine style" and "speech femininity" (and their masculine counterparts) interchangeably throughout this text.[9]

Figure 2 shows the relationship between years spent in parliament and the average predicted probability that a speakers' speeches were given by a woman. We break it down by cohorts, meaning the total amount of time MPs would come to spend in parliament. For example, row 15 shows the linear effect of years in parliament on speech femininity only for those MPs who stayed in parliament for exactly 15 years. In general we observe negative and significant effects for women MPs in the majority of cohorts, in particular

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[9]This approach builds on insights by Peterson and Spirling (2018) who used a similar approach for measuring polarization in the House of Commons: there, the easier it is for a model to tell if a speech is given by a Tory or a Labour MP during a parliamentary session, the more polarized the partisan discourse, since there is higher difference in word usage between them. Similar analysis has successfully been done on speeches in Poland as well (Przybyła and Teisseyre, 2014).

for those who stay in parliament for between 7 and 20 years, while for men the effects are mixed and mostly nonsignificant. This descriptive figure suggests that, no matter how long women come to stay in parliament, almost all cohorts adopt a more masculine style as they go.

Figure 2: Speech Femininity by Years in Parliament
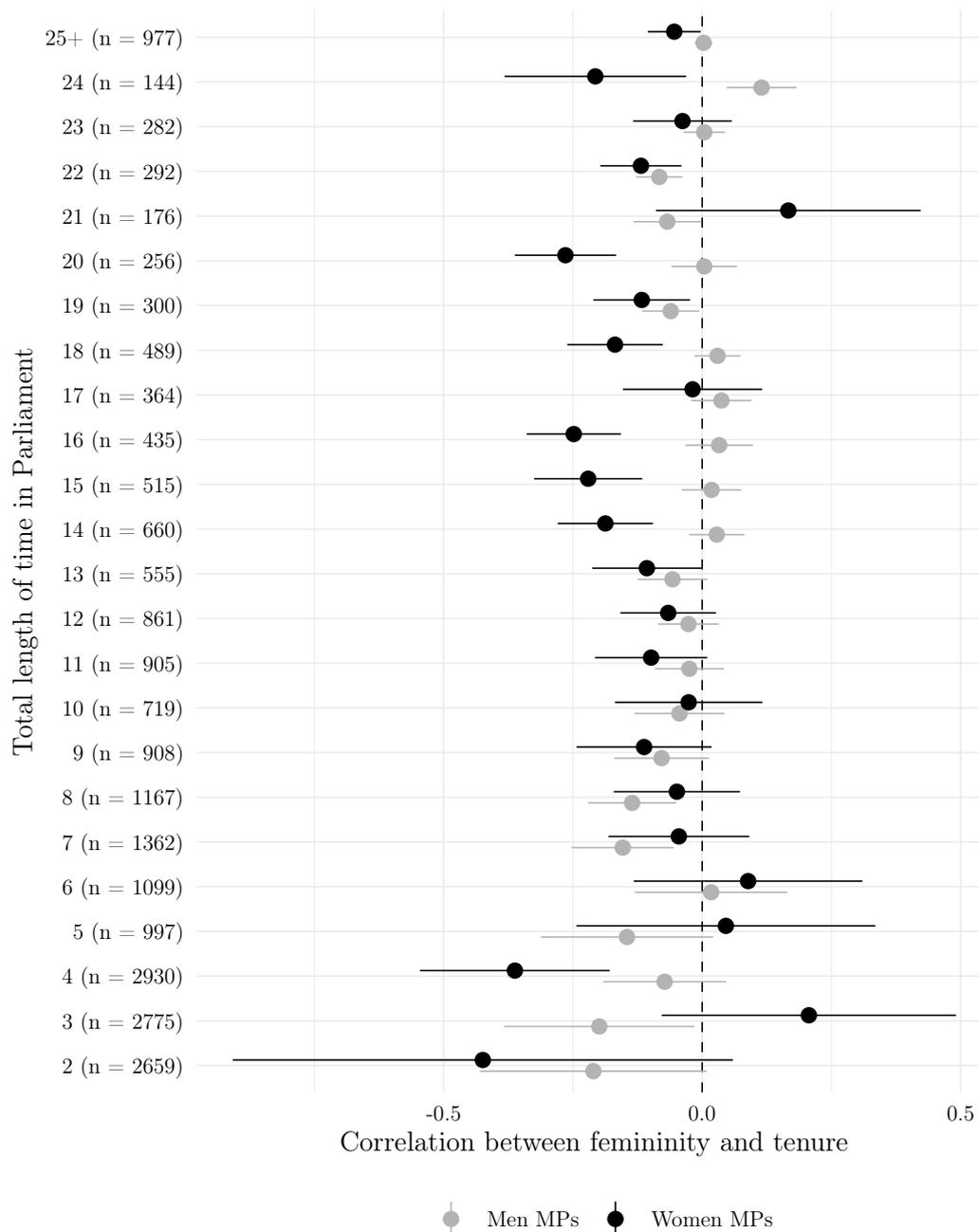
Note: Each row contains only MPs who stayed in parliament for that amount of years. For example, row 10 shows the effect of years in parliament on predicted probabilities for MPs who stayed in parliament for exactly 10 years. Effects are based on a bivariate linear regression.

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This observation can have several reasons. One is that, indeed, women's speech gets less distinctive the longer they remain in parliament (with the same happening for men). But it could also be a matter of the time: women's discourse being less distinctive in more recent years than it was in the 1990's. Also, it is possible that the lower/higher predicted probabilities over time are a statistical artifact, caused by increasing/decreasing accuracy of the classifiers: the more accurate they are, the more we may expect high probabilities for women and lower for men. To check which explanation holds and test our hypotheses, we turn to a series of multilevel models, described in the next section.

Explaining Gendered Language

For all analyses, the dependent variable is the average predicted probability across both classifiers for each speech.[10] The models include a set of covariates expected to account both for the statistical performance of the classifiers and substantive predictors and controls. The covariates are, first, the F1 score for each classifier. This controls for the increase/decrease in predicted probabilities that is expected given more accurate classifiers. If, for example, the machine learning algorithm worked very well in a given legislature-year, then predicted probabilities for women will be very high, and for men very low. This can be due to substantive differences in their speech, but also simply a statistical artifact. Controlling for the accuracy accounts for the statistical side of it.

Next, the main predictor to test the first hypothesis is the number of years the MP had been in parliament up to then. While more advanced measures of career progression, such as power acquired through committee memberships or influence on policy outcomes would be a great addition to this analysis, these measures are beyond the scope of this paper. We focus on the number of years in parliament as a suitable proxy for career progress, since it indicates political survival through re-election and correlates with power that is acquired within parliament (Ohmura et al., 2018). For hypothesis 2, we have the total number of years an MP would stay in parliament. The idea is that the group of women

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[10]The Pearson's correlation coefficient between the two classifiers is .75. The Online Appendix has models using predicted probabilities from each classifier separately, and all substantive results hold.

who would come to have a long career might behave differently throughout their entire careers from those who would stay in parliament for a short period.[11] Next, we also control for the share of women in the party in parliament, and for the share of women in parliament. These numbers are taken directly from the speech data. Finally, we take a series of variables from the V-Party dataset (Lührmann et al., 2020), including the party's position on women rights (with higher values indicating more progressive positions), the economic left-right scale (higher values meaning more to the right), the level of gender equality among the party leadership, and the party seat share in parliament. V-Party has the great advantage of covering a longer period and more countries than any other source, including all legislatures in this study. The downside is that about 100 small parties are not included, losing around 10% of women MPs. Finally, it is also plausible that women MPs in legislatures where there are gender quotas behave systematically different from those where there are no quotas. We control for it with a dummy variable based on data from the Varieties of Democracy project (V-Dem, Coppedge et al., 2023), which asks experts whether in the country there were gender quotas for the lower house in that year. We code it as 0 if there are none, and 1 if there is any type of quota in place.[12]

An important point concerns controlling for the topics women talk about. If women MPs give more speeches on certain areas, then the classifier will pick that up as "femininity", rather than differences in style. Wäckerle and Castanho Silva (2023) find that variance in speech femininity can be attributed both to linguistic features as well as to the topics being discussed. To account for that, in a setting with so many countries, languages, and texts, we define the topic of each speech using topic models. We fit a correlated topic model (Blei and Lafferty, 2007) with $K = 40$ within each legislative period for each legislature. Then, each speech is assigned to the topic which displays the highest frequency in it. We do not investigate qualitatively the content of all topics: this

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[11]To clarify, therefore, for an MP who stays in parliament for 10 years, this variable always take the value of 10 no matter at which point in their career the speech was given. The variable of years in parliament, on its turn, takes the value of how many years up to then the MP had been in office.

[12]The V-Dem question breaks the values down into four categories, depending on how strongly enforced the quotas are. However, 90% of the legislature-country years in our dataset have no quotas at all, which is why we dichotomize it.

would be practically impossible given so many legislative periods and languages.[13] The goal is simply to have a way of controlling for speech topic and accounting for variance in tone that is derived from women talking more about different issues than men in parliament. The topic-legislative session-legislature indicators are then entered to the models as random intercepts. It is important to highlight that the topics are not constant across legislative periods or countries. So, for example, topic 27 in the UK 2010-2015 is not the same words as topic 27 in the UK for 2005-2010, which is the reason why we refer to them above as topic-legislative session-legislature.

Modeling this data is no trivial task. We use a longitudinal multilevel model with speeches at the lowest level, and with speaker, topic-legislative session-legislature, year, and legislature random intercepts. Both the outcome and all predictors are centered at the legislature averages, since there are no legislature-level predictors of substantive interest. Moreover, our measure may have random variance across countries due to the machine learning models working differently across different countries for reasons of language, number of speeches/speakers, and so on, and this variance is not of substantive relevance. The interpretation of all findings, therefore, is that a predictor would be related to a woman speaking in a more/less feminine way in relation to the legislature's average.[14] We first present results for models fit only to the sample of women MPs, then models with all MPs and interactions between the main variables and gender, in order to compare effect sizes.

Speech femininity over time

Table 1 shows five models fit sequentially to the sample of women MPs. We start with only the year fixed effect (Model 1), and then the predictors' accuracy (Model 2). The

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[13]To validate the measure, we had research assistants code the topics obtained in two countries, Ireland and Germany, into policy areas, based on the top 20 FREX words for each topic. We then compare the results to the topic these speeches were assigned to in Wäckerle and Castanho Silva (2023), who hand-coded speeches into topics based on the title of the parliamentary debate in which the speech was given. Even though there is a large amount of noise in both measures, results in Online Appendix D show that there is a substantive correlation between topic assignment from topic models and hand-coding from debate titles, suggesting it is an effective way of classifying speeches into substantively meaningful policy areas.

[14]Models without centering are in the Online Appendix B, and all results remain the same. We also alternatively center using only the mean for Women MPs in all variables, and the results are even clearer.

year effect does not show a consistent trend to one side or the other. In the first three models, with few controls, it is negative, indicating that women have been getting more masculine in recent times. However, models 4 and 5, which control for party and parliamentary characteristics, find the opposite, whereby women's speech seems to be getting more feminine as of late. Figure B.1 in the Online Appendix B shows that this effect is present in most individual legislatures. This is the opposite of what Hargrave and Blumenau (2021) find when looking at speeches from the United Kingdom, but given the very different measures used we refrain from drawing substantive conclusions on this specific point. Next the machine learning accuracy, represented by the F1 scores of both Ridge and Boost, shows that naturally a very large portion of variance in predicted probabilities (i.e., femininity of the speeches) is due to classifiers being more or less accurate in a given legislature-year. This is by design, since the more polarized the predicted probabilities for men and women (i.e, higher values for women and lower for men), the more accurate the classifiers will be. These accuracy variables capture that variance in predicted probabilities which can be attributed to the models' performance in itself, leaving us with a residual variance in predicted probabilities which can be attributed to substantive factors.

Table 1: Predictors of More Distinctively Feminine Speech

	Women MPs						All MPs	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Year	−0.12***	−0.16***	−0.07***	0.04***	0.03***	0.03***	0.02**	0.03***
	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
F1 Ridge		8.02***	8.22***	8.28***	4.78***	4.72***	−5.44***	−5.61***
		(0.48)	(0.48)	(0.48)	(0.54)	(0.54)	(0.21)	(0.21)
F1 Boost		32.10***	32.08***	31.91***	34.30***	34.29***	−14.61***	−14.57***
		(0.24)	(0.24)	(0.24)	(0.27)	(0.27)	(0.12)	(0.12)
Years in parl.			−0.11***	−0.12***	−0.11***	−0.11***	−0.04***	−0.02**
			(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Total time in parl.			0.02*	0.03**	0.03***	0.03***	0.02**	0.02*
			(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Share women in party				0.64**	0.23	0.39	1.70***	1.82***
				(0.21)	(0.26)	(0.26)	(0.16)	(0.16)
Share women in parl.				−24.97***	−25.63***	−25.33***	7.16***	5.52***
				(1.03)	(1.13)	(1.13)	(0.57)	(0.57)
Gender equality in party leadership					0.06*	0.07**	0.05***	0.06***
					(0.03)	(0.03)	(0.01)	(0.01)
Party position on women rights					−0.10	−0.13*	0.39***	0.39***
					(0.06)	(0.06)	(0.04)	(0.04)
Party Econ Left-right					0.12**	0.08*	0.79***	0.78***
					(0.04)	(0.04)	(0.02)	(0.02)
Party seat share					−0.02***	−0.02***	0.05***	0.04***
					(0.00)	(0.00)	(0.00)	(0.00)
Gender quota					1.55***	1.53***	−0.14*	−0.14*
					(0.15)	(0.15)	(0.07)	(0.07)
Party pos. on women rights * Years in parl.						−0.02***		
						(0.00)		
Woman MP							53.46***	53.15***
							(0.11)	(0.11)
Woman MP * Years in parl.								−0.11***
								(0.00)
Num. obs.	1568385	1568385	1568385	1568385	1387757	1387757	5731149	5731149
Num. topics	7420	7420	7420	7420	7101	7101	7381	7381
Num. speakers	6824	6824	6824	6824	6115	6115	21471	21471
Num. parties	425	425	425	425	272	272	307	307
Num. legislatures	25	25	25	25	25	25	25	25

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$

Next, we can observe a clear effect of how long women have been in parliament, which speaks in favor of Hypothesis 1: the longer women stay in parliament, the less feminine their speech is, with coefficients consistently around $\beta = -.11$ and $SE = .01$. The total time they spent in parliament, however, has a positive and significant coefficient, albeit with a much smaller size ($\beta = .03$, SE $= .01$). Nevertheless, it goes *against* the expectation of Hypothesis 2, which stated that women who come to stay long in parliament have more masculine styles. On the contrary, women who would come to have longer tenures in office seem to have a slightly more feminine style than those who end their careers with shorter periods in politics – and consider we already control for the fixed effect of year, whereby women in politics more recently may have a more masculine style. These two results taken together show evidence in favor of a socialization mechanism, whereby women's style gets more masculine over time, rather than a selection mechanism, through which women with more masculine styles to begin with would succeed more in politics.

Figure 3: Interaction Effects between Parties' Position on Women Rights and Women MPs' Tenure in Parliament


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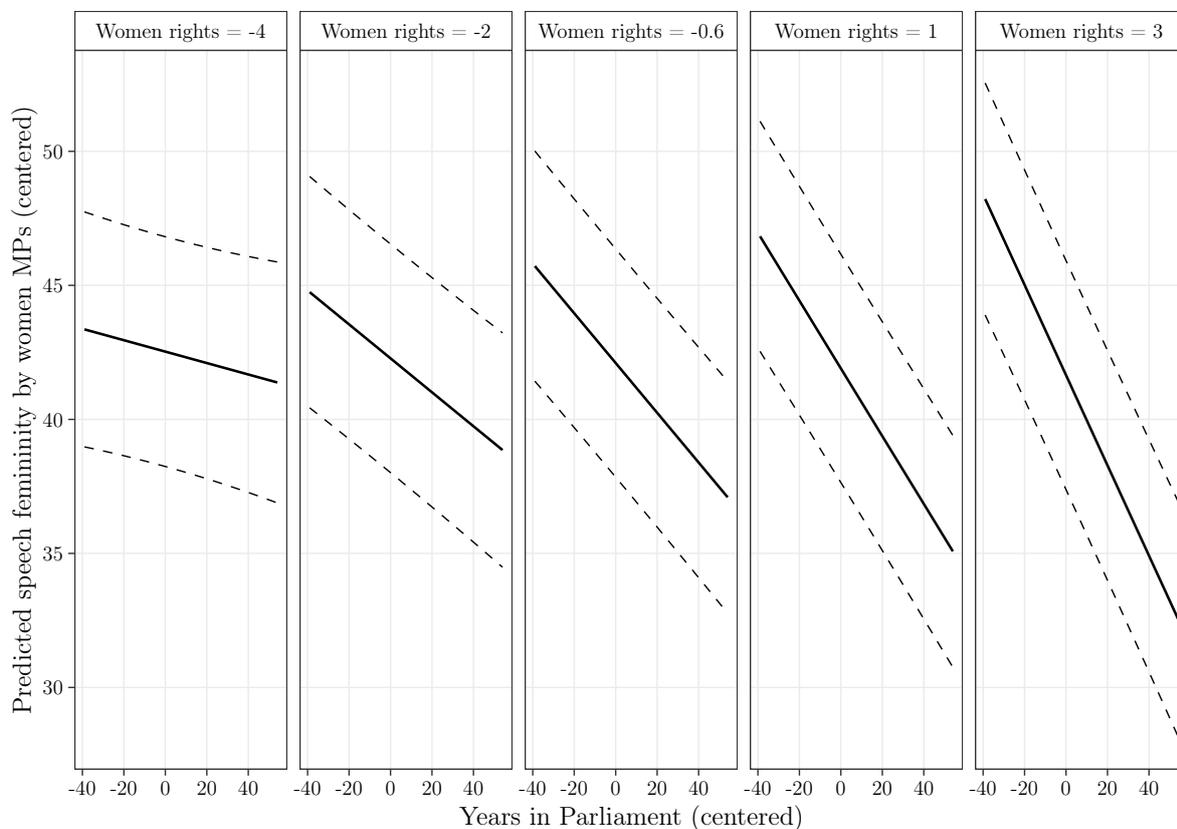
Third, we also find evidence in favor of Hypothesis 3. Women MPs in parties that hold more progressive views on women's participation in the workforce speak with a significantly more masculine style ($\beta = -.13., SE = .06$, model 6), and they are the ones whose speech gets the most masculine throughout their terms, as evidenced by the interaction term in Model 6, visualized in Figure 3. Women in parties that have more conservative views on women's rights (lower values, to the left of the graph) keep largely the same level of femininity in their discourse throughout their careers. The tenure effect appears largely driven by women in parties with more centrist or progressive views on women's rights, who do get much less distinctively feminine the longer they stay in elected office.

This unites ideas from the literature that might initially appear contradictory. Literature tells us that conservative parties have fewer women, distrust women, and generally prefer men (Bernhard, 2021; King and Matland, 2003; Bauer, 2020), and yet the women in these parties speak more femininely. While progressive parties have more women members and evaluate femininity more positively, in our model, these women speak more masculinely than women in conservative parties. We argue, supported by the findings in this model, that progressive parties have more expansive views on acceptable gender performance, and thus women in these parties are freer to speak in a variety of styles. Conservative women MPs work within a context that prefers men over women, but that also prefers that those women who do participate present their gender in specific traditionally feminine ways. This suggests that in conservative parties, women might be more expected to "stay in their lane", and behave in gender-stereotypical conforming ways. Moreover, we see that this effect is restricted to the cultural dimension of ideological competition: parties' orientation on the economic left-right has the opposite relation to women's gendered discourse in parliament. Finally, we also see that a higher share of women in parliament is associated with women speaking in a more masculine way, in Models 4-6.

Models 7 and 8 in Table 1 are fit with all MPs in the dataset, and include a control for MPs' gender. The purpose is to see if and how the effects observed earlier for women

MPs vary between women and men. For instance, if the effect of discourse getting more masculine over the years in parliament is due to MPs speaking more about traditionally masculine issues, which are associated with more prestigious and powerful positions, we may expect that men's discourse to also get more masculine. Indeed, that is what we find in Models 7 and 8: the main effect of years in parliament remains negative. However, this effect size is much smaller than that for women only. As we can see in Figure 4, based on the interaction in Model 8, the coefficient for women is around $\beta = -.13$ while for men it is close to $\beta = -.02$. This suggests a much larger shift in women's discourse during their parliamentary careers, which is adding both the change towards more "presitigious" and "masculine" topics, shared with men, with the turn towards more masculine style, particular to women.

Figure 4: Coefficients of Years in Parliament on Speech Femininity for Men and Women MPs
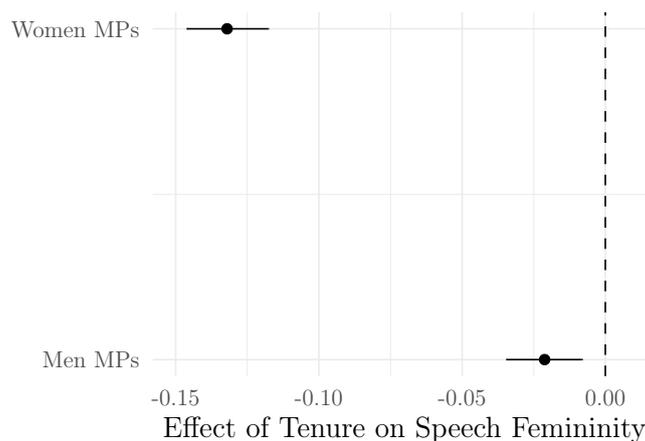
In the Online Appendix we present a series of robustness and sensitivity tests for our analyses. First, Figure A.1 shows individual legislature results for the coefficient of "Years in Parliament", meaning the effects obtained if running the model 5 from Table 1 separately in each legislature. The effect is negative in all but one (Greece), and significant in more than half, which is strong evidence that the socialization results are not driven by an outlier or by only a handful of cases. Second, in the analysis here we use an ensemble between predicted values produced by Ridge regression and the XGBoost algorithm, meaning the average predicted probability for each speech between both models. In

Online Appendix C we present results running all models using the results from only one or the other for measuring femininity in speeches, and substantive findings hold: the socialization effect is present and significant in all specifications, while the effect of "Total time in parliament" is either nonsignificant or even positive, indicating that women who come to have longer tenures appear on average more feminine. The interaction effect from Figure 3 is confirmed with both, showing that women MPs getting more masculine during their time in office is indeed much more pronounced in socially progressive parties. We also show results from running models without centering, and centering only at Women MPs' means in each legislature, with results remaining the same in both. Finally, we also present a validation exercise for both the topic models and the measure of speech femininity, showing that both are capturing meaningful substantive and stylistic features.

Conclusion

Succeeding in a male-dominated environment often requires women to adapt their style and behavior to fit into pre-existing rules and expectations, set up by generations of men who occupied positions in it. While this had been demonstrated in areas such as police forces, corporations, or academia, there had been no studies to date on whether women in politics face the same incentive to "blend in" as they are socialized into parliamentary life. We argue that, on the one hand, the incentive to adopt a more masculine style would be particularly acute in politics, where good leadership traits are still associated with being a man – even six decades after Ben Gurion and Golda Meir – but that it may play out differently than in other organizations due to the incentives that some women, those in conservative parties, may face to follow more traditional established gender roles.

We test how these competing incentives play out in women's parliamentary careers, building upon an inductive machine learning approach for measuring gender performance, and applying it to a comprehensive dataset of legislative speeches across 24 democracies and 19 languages over 35 years. These robust analyses demonstrate that women speak in a significantly less feminine way the longer they stay in parliament, but that women

in conservative parties particularly speak in more distinctively feminine ways. These measures of femininity control for the subject of the speech, making clear that not only do women MPs make speeches on different topics than men, but within the same topic, we can still identify a stylistic difference between men and women. These findings are important to better understand parliaments as gendered workplaces. We can see here how women MPs partially adjust their behavior in order to succeed in politics. In other words, it is not the case that women who spoke more masculinely in the beginning of their careers stay in parliament longer, but rather women MPs' speech becomes more masculine the longer they stay in parliament. Moreover, we also observe an important linkage with descriptive representation: the more women there are in a party, the more that all the members of the party adopt a more feminine discourse.

These findings shed light on an understudied aspect of women's political careers: how they adapt (or not) to a male-dominated environment, and how they respond to contradicting incentives related to established rules of behavior and style. We show how parliaments resemble other organizations historically dominated by men, where women blend into established norms as they get socialized into that environment. Unlike in other organizations, however, we find this process to be heterogeneous, shaped by the ideological leaning of the party of a representative. This suggests that the way in which women adapt to the parliamentary environment is shaped by the party they are in and the (se-)electorate that (re-)elects them. We are able to see here for the first time the interplay between personal style and tenure for women in politics across several countries. Further study should expand on these findings to better understand the individual-level motivations that drive this process.

One aspect we have not integrated into our analysis is intersectionality. The literature indicates that theories we discussed may apply differently to different groups of women based on their personal identities. Scholarship on intersectionality demonstrates that people who hold multiple marginalized identities, such as women who are also people of color, disabled, LGBTQ+, immigrants, etc., have a different experience than people who are only members of one marginalized community, e.g. white, straight, able-bodied, women

with local citizenship (Crenshaw, 1989). Rosette et al. (2016) explore how women's double bind manifests differently for white, Black, and Asian women based on interactions between the bind's agentic deficiency and agentic penalty with stereotypes about people of different racial groups. In their 2012 literature review on the subject, Snaebjornsson and Edvardsson (2012) find that there is limited research available on the intersection of gender-based leadership styles and nationality-based leadership styles, but there is reason to believe that both gender and nationality play a role in leadership style and the evaluation of leaders. There is even evidence of the queen bee phenomenon occurring along ethnic lines rather than gender (Derks et al., 2015), and Celis and Erzeel (2017) indeed find that parties in Belgium nominate ethnic minority women as a way to "tick as many boxes as possible" with the smallest number of new candidates. Examining the multiplicity of interactions between various marginalized identities and gendered speech patterns across the many countries we study is beyond the scope of this paper and will require gathering significantly more diversity data than is easily available particularly in European countries, but we believe it would make for very interesting future research.

Another area for future research is the question of how much power an MP acquires throughout their tenure. In this paper, we explore genderedness as related to the length of the MP's career, but we also know that not all long parliamentary careers are equal. Some MPs will ascend to party leadership and ministerial posts, while others remain backbenchers working quietly on behalf of their communities. However, research suggests a robust connection between tenure and political influence, for example through the committee positions MPs hold (Mickler, 2021), the power they acquire on both federal and state level (Stolz, 2003), and the way in which pre-parliamentary careers impact access to power once elected (Ohmura et al., 2018). Future research could build upon this work to further explore how gendered speech may relate to women MPs' increasing power throughout their careers and assignment to more or less gendered ministries and committees. The study conducted here opens several venues to better understand women's behavior in legislatures across countries, and how that affects their political trajectories.

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