

Speaking Up, Speaking More? Gender Dynamics in Committee Hearings

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Abstract

Female legislators have been shown to focus on different issues and sponsor legislation at different rates than their male counterparts. Among ordinary citizens, experimental data suggests that female participation increases with the number of women present, particularly under majority rule. We bridge the gap between these two literatures by investigating gender dynamics in congressional committees. Using a variety of speech-based outcomes from transcripts of congressional committee hearings and a generalized difference-in-differences design, we show how the gender composition of a committee affects members' participation rates, sentiment, and aggression. We find that increased proportions of women on a committee (1) *negatively* impact the speaking instances and number of words spoken among senior men and (2) *positively* impact the same outcomes for majority party women. However, the sentiment and aggression exhibited by committee members of either gender are not influenced by the gender ratio. Taken together, these results suggest that the gender ratio has diverging effects on how men and women participate in the deliberative stage of policymaking, although style remains unchanged.

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Introduction

The underrepresentation of women is a persistent problem in American political institutions. Normative theorists have argued that this lack of descriptive representation is harmful due to female representatives' unique ability to relate to their female constituents. Beyond simple numerical representation, the perspective of female legislators allows them to articulate views and facilitate deliberation around policies in a way that is distinct from their male colleagues (Mansbridge 1999). Empirical analyses have largely supported this view, with several studies showing that female legislators are more likely to promote women's issues, perform constituency service, and deliver more federal funds to their district (Anzia and Berry 2011; Lazarus and Steigerwalt 2018; Holman and Mahoney 2018).

An implicit assumption in the existing literature is that as more women are elected, women's descriptive representation will increase. This is inherently true if we equate improved descriptive representation with women merely *holding* elected seats. However, if descriptive representation also requires that female elected officials are able to fully articulate their views and contribute to the creation of policy, then simply increasing the number of women may not be enough (Kathlene 1994). Indeed, there is ample evidence that simply increasing the number of women in a group is not enough to increase participation; a growing experimental literature shows that when women are severely outnumbered in group decision-making settings they are less likely to take part in deliberations (Karpowitz, Mendelberg, and Shaker 2012; Mendelberg, Karpowitz, and Oliphant 2014).

The structure of deliberations in these experiments closely resemble the workings of congressional committees, on which women are severely outnumbered by men. Even as more women have been elected to the House, the House itself and, in particular, its committees, are still far from reaching gender parity. Even when looking at congressional committees specifically – the legislative units in which members carry out the bulk of congressional work – there are *no* congressional committees that have reached even close to gender balance. Gender imbalance is even more apparent on the most prestigious committees; while the percentage of women on the Budget Committee is currently about 22 percent, the percentage of women on the Foreign Affairs Committee (typically

regarded as more prestigious than Budget) remains at a staggeringly low 8 percent. How does this gender imbalance influence the participation of women in their committees?

We investigate how the gender composition of congressional committees affects the participation rates and styles of members' behavior on committees. To do so, we use a generalized difference-in-differences design and estimate the effect of the percentage of women on a committee on participation-related outcomes for women and men on the committee. Using an extensive data set of congressional committee hearing transcripts from 1995 to 2018 (104th to 115th Congress), we generate speech-based outcomes that capture how often a member attends their committee's hearings, the proportion of times a member speaks in those hearings, how positive or negative the speech of a member is, and how aggressive the speech of a member is. We examine whether changing the percentage of women on a committee influences these outcomes. Notably, we find positive effects of the percentage of women on participation-related outcomes for majority party women. Additionally, our analysis also reveals that high seniority men speak significantly fewer times and words as the percentage of women on the committee increases.

This is a preliminary paper; our future work will expand on these findings in three ways. First, we will examine how the effect varies across congressional committees and other characteristics in order to analyze further heterogeneity. Second, we will investigate the selection process that determines which women get elected to Congress. The rigorous process may result in a group of female representatives who react to the gender composition differently than participants in previous experimental settings in the existing behavior literature. Finally, we will incorporate other measures of how members of Congress participate in hearings, including topic-based content.

No matter what this future work finds, our results point to important results about how the gender composition of legislatures affects the behavior of individuals within the institution. We return to this point in the conclusion.

Descriptive Representation and Participation

Improving descriptive gender representation in political institutions is often equated with simply electing more women. However, prior work has challenged whether merely ensuring that women

hold elected office is sufficient to provide the substantive representation of female political interests. For example, Kathlene (1994) notes the dangers of idealizing numeric descriptive representation. Taking such a rosy view “ignores the social dynamics that subordinate women’s words and actions even in ‘well-balanced’ male and female group interactions” (560). While the literature on descriptive representation was optimistic about the increasing number of women in Congress, Kathlene asserted that simply increasing numbers wasn’t enough. She suspected that the power structures that limit women in society were also at play in Congress, leaving female members at a relative disadvantage to their male peers. Essentially, “sexism, rather than group size, produces inequities” (561). While Kathlene investigated the of role group size and gender in the committee system of the Colorado state legislature, we expand upon this work by investigating the speech patterns of members in Congress in committee hearings.

We analyze congressional committee hearings because the committee process is an important, formative step in congressional policy-making and committee hearings are a fundamental way through which a committee carries out its work. When a bill is introduced in Congress, it is first considered by the committee (or multiple committees) under whose jurisdiction the bill falls. The committee can change the content of the bill as much as it wants, and can either report their final version of the bill to the floor for a floor vote, or “kill” the bill by not advancing it further. Through this process, committees act as the central legislative units of Congress; scholars have extensively documented the congressional committee’s strategic policy-making position, characterizing committees as gate-keepers of their jurisdictions, policy experts, and agenda controllers in their policy area (Shepsle and Weingast 1987; Smith and Deering 1984; Fenno 1973; Weingast and Marshall 1988; Cox and McCubbins 1993).

Further, committee hearings are an important way in which committees carry out their work: committees hold hearings to collect information and expert opinions on proposed legislation, to investigate events, and to evaluate the activities of a governmental department. Each of these functions are essential for policy making. Committee hearings on bills referred to the committee are a place where important parts of the bills are debated and discussed. Hearings are not only held to debate current legislation under consideration, but may also be purely exploratory in nature for

potential future legislation. In a hearing, members from both the majority and minority parties are given the chance to make statements, ask questions, debate opinions, invite outside witnesses to testify, and question outside witnesses about the legislative topics at hand. In general, hearings provide an opportunity for committee members to engage with each other during the committee process as they collect information and discuss policy.

Committee hearings thus represent an important step in the committee process and a fruitful data source to examine members' participation rates and participation styles during the committee stage. Indeed, other research has found that congressional committee hearings are useful for related purposes: Ban (2018) uses members' speech in committee hearings to capture the amount of disagreement present among committee members on bills under consideration, and Curry (2015) finds, from interviews with committee chairs and staff, that committee leaders often rely on what committee members say in hearings to gauge members' expected support or objection on issues under consideration.

Given their central legislative role, committees have the potential to exacerbate the effects of gender imbalance in a chamber. The aggregate imbalance in Congress is large: the 115th Congress, the most diverse ever, only contains 84 women in the House and 22 women in the Senate.¹ As a result, committees, which divide members into groups based off of district interests and expertise, vary highly in the number of female members. Notably, gender dynamics may have large implications in committee due to the deliberative nature of the committee stage. The committee stage is characterized by discussion and deliberation over the bill under consideration, facilitated through *verbal* means during committee meetings and hearings.

Even if the number of women in a committee is proportional to the number of women on the floor, their participation may vary depending on the number of other women present. We expect that as the share of women on a committee increases, women will participate more. This hypothesis is supported by numerous experiments and is rooted in critical mass theory, which predicts that women's participation is closely tied to the percentage of the group that they make up (Karpowitz, Mendelberg, and Shaker 2012; Mendelberg, Karpowitz, and Oliphant 2014). For example,

¹<http://www.cawp.rutgers.edu/women-us-congress-2018>

Mendelberg, Karpowitz, and Oliphant (2014) test how the decision rule of a group interacts with the number of women present to affect their participation and influence within the group (20). After randomly assigning the gender composition and decision rules, they conclude that “the worst condition for women’s participation and influence is the one most prevalent in the world - majority rule with few women” (20). This finding suggests that the current structure of the committee system has high potential for imbalance, although that imbalance should decrease as the number of women grows.

While the prior experimental work is compelling, there are also numerous reasons to believe that female members of Congress may actually behave differently than female state legislators, female participants in an experiment, or the female population at large. First, it has been shown that female incumbents are of higher quality than male incumbents due to high barriers to entry for female candidates (Milyo and Schosberg 2000). Volden, Wiseman, and Wittmer (2013) also find that women are more effective legislators than men, at least when they are in the minority party, as they are more effective at coalition-building and keeping their bills alive. Finally, beyond just sponsoring legislation, women also bring home more federal funding and pay more attention to constituents than their male counterparts (Anzia and Berry 2011; Lazarus and Steigerwalt 2018). As a result, the expected patterns in participation may not replicate when tested on women in Congress, as these women were selected into a highly male and competitive environment and are high quality legislators.

We note that we are not the first to study the speech and participation patterns of women in Congress. For example, Mattei (1998) analyzes the speech patterns of female witnesses, while Shogan (2001), Osborn and Mendez (2010) and Pearson and Dancey (2011) analyze gender differences on the Senate and House floors. Additionally, scholars have analyzed how minority status affects behavior in committees (Gamble 2007). However, we are the first to take advantage of the changing gender distribution of committees to gain causal leverage in analyzing the effects of gender on participation. Additionally, we analyze a unique set of variables that provide new insight into behavior in congressional hearings, beyond just number of words spoken. Such variables include the percent of hearings spoken in, positive and negative words used, and general measures

of aggressiveness.

Data

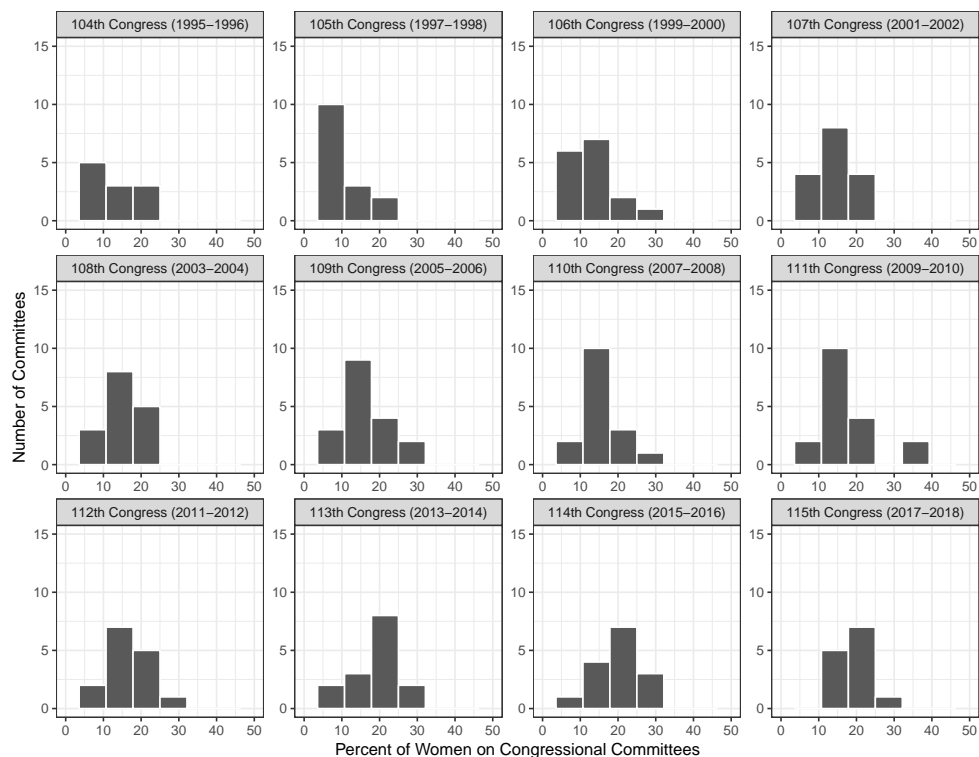
Female Representation on Congressional Committees

Data on congressional committees comes from Stewart III and Woon and Garrison, which includes all committee assignments from the 104th through the 115th Congress. Congressional committee assignments were then merged with data from Volden and Wiseman (2014), giving us a dataset consisting of the congressional committee assignments, legislative characteristics, and demographic characteristics for each member. Members who died in office, resigned, or were elected in special elections are not included in the analysis, as measures of their participation patterns would not be representative of the entire legislative session. However, women who were in Congress long enough to be given a committee assignment are still included in the count of women on the committee.²

As displayed in Figure 1, the average percent of women on congressional committees ranges from 0 to a little over 40 percent, with no committee ever reaching equal representation. But also note that there is substantial variation in the proportion of women who are members. We utilize this variation below in our research design to assess how the composition of the committee affects the behavior of women.

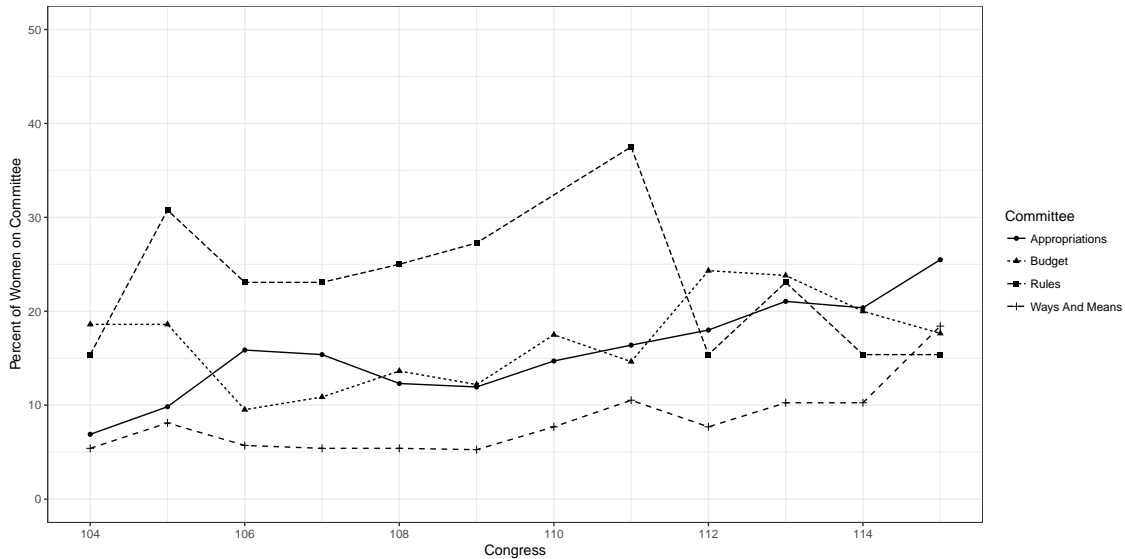
²While women that were in Congress for a limited time are included in the dataset, albeit without controls, the following women are excluded entirely from the dataset due to their lack of committee assignments: The 102nd Congress: Jocelyn Birch Burdick (ND-Dem), 109th Congress: Shelley Sekula Gibbs (TX-Rep), 110th Congress: Marcia fudge (OH-Dem), 111th Congress: Hilda Solis (CA-Dem) and Julia Carson (IN-Dem), 112th Congress: Suzan Delbene (WA-Dem), 113th Congress: Alma Adams (NC-Dem). Please see <http://history.house.gov/Exhibitions-and-Publications/WIC/Historical-Data/Women-Representatives-and-Senators-by-Congress/> for explanations of their absences.

Figure 1: Percent of Women on Congressional Committees, 104th to 115th Houses



Variation in female representation in the committee system is also demonstrated by Figure 2, which displays the percentage of women on key congressional committees over time. The committees on Appropriations, Budget, Rules, and Ways and Means stand out as being unique gateways to power and respect in Congress. In addition to their agenda setting and financing powers, they are often composed of party leaders and can be used to signal ability to constituents. The Rules Committee, which sets the stage for legislative debate on the House floor, experienced a stark rise and fall of female representation over time, and has had the highest percentage of women in comparison to the other important committees listed. Ways and Means, in contrast, has had consistently low representation, remaining under 10 percent for a significant portion of the period under study. However, it has recently seen an increase in the proportion of women, catching up to Rules and Budget.

Figure 2: Percent of Women on Key Congressional Committees, 104th to 115th Houses



Committee Hearings

We measure our speech-based outcomes from the text of congressional committee hearing transcripts.

We use committee hearings to investigate whether legislative participation varies by gender of speaker as well as gender composition of those in attendance. Specifically, we examine members’ participation rates and participation styles in committee hearings. We use data from Congressional Quarterly (CQ), which includes all House standing committee hearing transcripts during the period 1995-2017. CQ transcripts are made available through a subscription service; the hearing transcripts come from a CQ staffer sitting in on hearings and transcribing the proceeding in real time. Table 1 lists the number of hearings in our dataset by committee.

Importantly, for our purposes, House rules guarantee that any committee member interested in participating or speaking in committee hearings may do so. House Rule XI clause 2(j)(2) stipulates that every committee member who wishes to question a witness will receive, at minimum, five minutes to do so. After every committee member who wishes to take a five minute period does so, the committee may then allow additional time and allocate the time as they wish. Other rules provide

Table 1: **Summary of Hearings Dataset**

Committee	Number of Hearings	Percent
Agriculture	99.00	1.40
Appropriations	847.00	11.98
Armed Services	730.00	10.33
Budget	287.00	4.06
Education And The Workplace ^a	156.00	2.21
Energy And Commerce ^b	525.00	7.43
Financial Services ^c	719.00	10.17
Foreign Affairs	367.00	5.19
Government Reform	220.00	3.11
Homeland Security	481.00	6.80
International Relations	353.00	4.99
Judiciary	611.00	8.64
Natural Resources ^d	58.00	0.82
Oversight And Government Reform ^e	395.00	5.59
Rules	26.00	0.37
Science And Technology ^f	120.00	1.70
Small Business	117.00	1.66
Standards Of Official Conduct	8.00	0.11
Transportation And Infrastructure	388.00	5.49
Veterans Affairs	340.00	4.81
Ways And Means	222.00	3.14
Total	7,069.00	100.00

^a Also called Education and Labor and Education and the Workforce

^b Also called Commerce

^c Also called Banking and Financial Services

^d Also called Resources

^e Also called Government Reform

^f Also called Science, Space, and Technology, and Science

procedures for how committees can extend the minimum five minute question periods, though any extension is mandated to be equally divided between the parties (Rule XI clause 2(j)(2)(B)). These rules are important for our analysis because it means that anyone who wishes to participate in a committee hearing can do so; each committee member has the same opportunity as any other committee member to speak up in a committee hearing. It would be problematic for our analysis if partisan politics or rules restricted the chance of a committee member to participate, e.g. if the majority party can suppress the participation of the minority party members, as then participation patterns may not be determined by the individual's own wishes or efforts but also artificially affected by institutional norms or partisan politics. However, the aforementioned House rules ensure that this is not the case, at least when it comes to the opportunity to participate. Further protection is given to the minority party in committee regarding witness testimony in hearings; minority committee members are guaranteed time to call their own witnesses of their choosing to testify in at least one day of every hearing. This minority protection, called the "Minority Witness Rule" (House Rule XI clause 2(j)(1)), works to further ensure that any committee member who is interested in participating in a hearing through the calling and questioning of their own witnesses may have the chance to do so, regardless of their membership in the majority or minority party.

Measuring Legislative Participation Using Committee Hearings

Using the text data on congressional hearings, we construct three sets of outcome measures for each committee member's speech in a committee's hearings during a congressional session. First, we measure *how much* members of Congress participate in the committee. Second, we measure the *sentiment*, in terms of positive or negative tone, of what representatives say while on the committee. Third, we measure how *aggressive* the commentary is on the panel. In this section we describe each variable and how it is measured.

0.1 Participation

In order to study how gender imbalance (or balance) on congressional committees may influence women’s participation, we need to construct outcome measures of participation. To do so, we look at frequency and length of a member’s participation in hearings. We begin by examining the percent of a committee’s hearings that a member participates in. A committee holds multiple hearings during a congressional session, and the number of hearings that a member attends is one measure of how engaged a member is in that committee’s activities. For a member on a given committee in a congressional session, *Percent of Hearings Spoken In* is the number of hearings of that committee that the member speaks in divided by the total number of hearings that committee held. Next, we look at how much a member speaks in their committee, compared to how much the other committee members speak. *Percent of Speaking Instances* is the number of times a committee member starts speaking in the committee’s hearings, divided by the total number of times all committee members started speaking in the committee’s hearings. This captures the extent of a member’s participation in a committee; for instance, a member who on average asks 10% of the questions is more engaged than a member who on average only asks 5% of the questions. Relatedly, for our third measure of participation patterns, we use the length of a member’s speech in hearings. *Percent of Words Spoken* is the number of words a committee member speaks in the committee’s hearings, divided by the total number of words spoken by all committee members in the committee’s hearings. Again, this third measure captures how much a member participates; for example, a member who is responsible for 25% of all speech heard in a hearing is participating more than a member who only speaks for 10% of the hearing. Thus, for our outcome measures of participation patterns, we have three variables at the member-committee level: *Percent of Hearings Spoken In*, *Percent of Speaking Instances*, and *Percent of Words Spoken*³

Thus, for a given Congress, we have three variables at the member-committee level for participation: *Average Instance of Participating Across Hearings*, *Average Instance of Speaking Across Hearings*, and *Average Length of Speech Across Hearings*. Table 2 presents summary statistics for

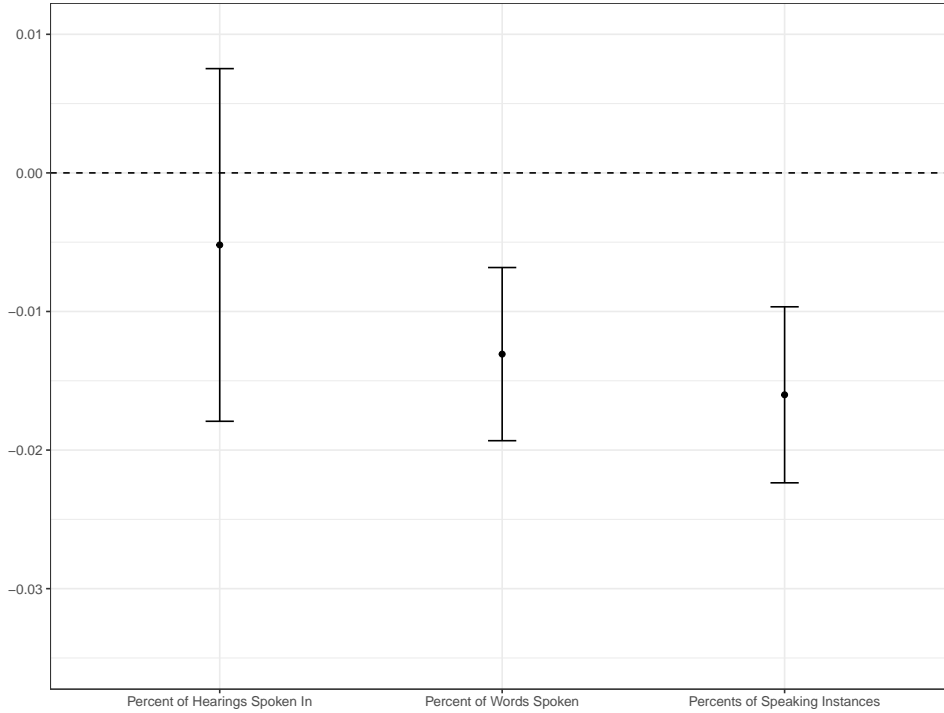
³As a clarifying example: if a committee only held two hearings in the congressional session, and a given committee member speaks 20% of the words in the first hearing and 30% of the words in the second hearing, that committee member’s *Percent of Words Spoken* would be 0.25.

these variables. Figure 3 presents the results from two sided t-tests analyzing if there are significant differences in participation by gender along with 95 percent confidence intervals. The results suggest that while women do not speak in fewer hearings than men, they do speak significantly fewer words and significantly less often.

Table 2: Summary Statistics, Participation Measures

	Male (N = 5540)	Female (N = 993)
Percent of Speaking Instances		
min	0.001	0.001
max	1	1
mean	0.099	0.083
Percent of Words Spoken		
min	0	0
max	1	1
mean	0.099	0.086
Percent of Hearings Spoken In		
min	0.005	0.009
max	1	1
mean	0.254	0.249

Figure 3: Difference in Participation Patterns by Gender



Sentiment

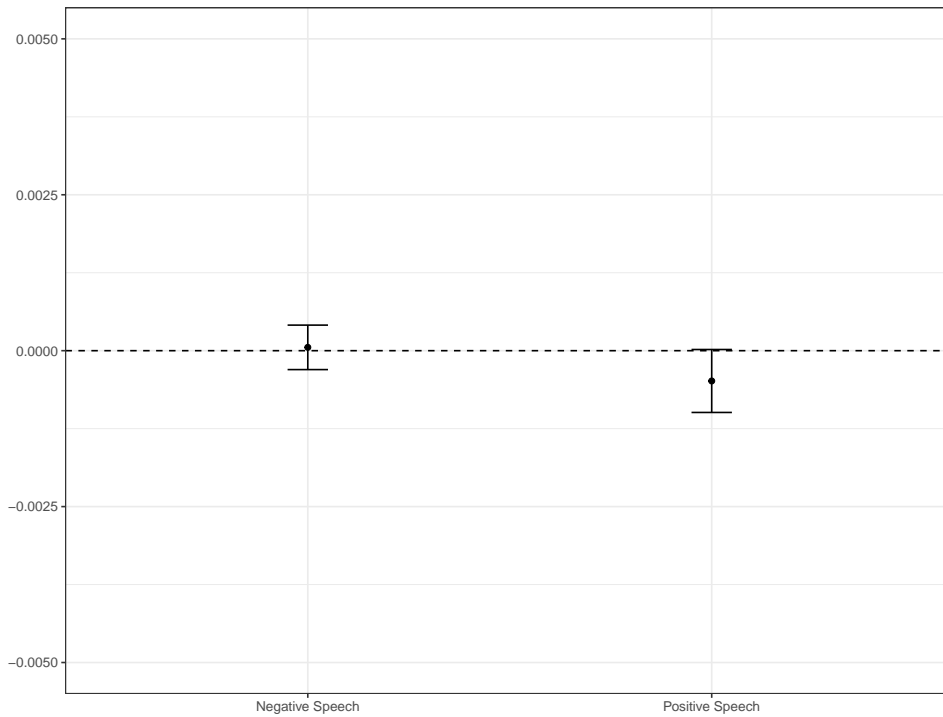
We are also interested in how the gender ratio on congressional committees may affect the tone or sentiment of the discussion on the committee. Following this, we construct outcome variables that capture the positive and negative sentiment in a member’s speech from committee hearings: *Positive Speech* and *Negative Speech*. We use the dictionary of positive and negative words from Wilson, Wiebe, and Hoffmann (2005), and count the number of positive words and the number of negative words that each member uses in committee hearings. Then, for each member of the committee, we take the number of positive (negative) words spoken by that member in the committee’s hearings as a percent of total words spoken by that member in the committee’s hearings. We choose to look at these outcomes because we are interested in analyzing how member’s own speech style may change as a result of the gender composition of a committee. This gives us with two variables at the member-committee level (for a given Congress) for sentiment: *Positive Speech* and *Negative Speech*. Table 3 presents the summary statistics for these variables, and Figure 4 presents the results from

two sided t-tests. The results do not suggest differences in sentiment by gender; women do not speak significantly more/fewer positive or negative words than men do.

Table 3: Summary Statistics, Sentiment Measures

	Male (N = 5540)	Female (N = 993)
Percent Words Positive		
min	0	0
max	0.091	0.143
mean	0.029	0.028
Percent Words Negative		
min	0	0
max	0.073	0.065
mean	0.015	0.015

Figure 4: Difference in Sentiment by Gender



Aggression

While an interesting start, positive and negative tone may not be able to fully capture how

the deliberative dynamics of a committee changes when the number of women on the committee changes. Instead of sheer negativity, there may be a change in the amount of aggressive behavior. To try and capture this, first we examine the incidence of *anger* in the words members speak. We measure this using the crowd sourced dictionary introduced in Mohammad and Turney (2013). As we did with sentiment, we divide the count of aggressive words by the share of all words that member speaks in a given committee’s hearings. This give us the measure we refer to as *Aggressive Speech*. Once again, the difference in means for males and females is not statistically significant.

Table 4: Summary Statistics, Aggression Measure

	Male (N = 5540)	Female (N = 993)
Aggressive Speech		
min	0	0
max	0.500	0.065
mean	0.022	0.021

Finally, in our immediate future work, we aim to capture aggressive behavior in a more direct way: the number of interruptions that a member experiences and the number of interruptions that a member makes. The news media has publicized incidents where committee members interrupt other committee members and has noted the gender undertones of this behavior. For instance, during Senates hearing in June 2017, Kamala Harris was interrupted multiple times by Senator Richard M. Burr and Senator John McChain in two consecutive hearings. Several news reports and politicians themselves labeled these cases as sexism, with a male colleague also on the same committee noting that “She [Kamala Harris] was doing her job. She was interrupted for asking tough questions. I was not interrupted.”⁴ The committee hearing transcripts from *Congressional Quarterly* enable us to measure the extent to which these interruptions occur, as interruptions can be seen in the transcripts where statements end without an “ending” punctuation or where statements end with an unfollowed dash mark. We plan to measure the rate of this behavior after identifying all instances where sentences end without punctuation.

⁴<https://www.nytimes.com/2017/06/13/us/politics/kamala-harris-interrupted-jeff-sessions.html>

The Effect of Gender Composition on Participation

First, we begin by analyzing the effect of increasing the number of women on a committee on the participation patterns of both men and women. We use the following model with our outcome variables:

$$Y_{it} = \beta_1 \text{Percent of Women on Committee} + \gamma Z_{it} + \alpha_i + \mu_t + \varepsilon_{it}$$

All standard errors are clustered at the member-committee level. Z_{it} represents the time-varying legislator controls, including seniority, majority party status, committee chairmanship status, DW-NOMINATE score, previous vote percentage, and membership on key committees (Appropriations, Budget, and Ways and Means). These control variables come from the Volden and Wiseman data on legislative effectiveness⁵. α_i represents member-committee fixed effects, μ_t represents Congress fixed effects, and ε_{it} is the error term.

The results for the first set of outcome measures – participation patterns – are displayed in Table 5. As explained in the previous section, we capture participation using three different variables: the percent of speaking instances of a member (of the total number of speaking instances), the percent of words a member speaks (of the total number of words spoken), and the percent of hearings a member speaks in (of total number of hearings a committee held). The first two columns report the coefficient estimates on the subset of women, and the third and fourth columns report the coefficient estimates on the subset of men. In each set of columns, the first column represents estimates without controls, and the second column includes the control variables.

⁵<http://www.thelawmakers.org/#/downloads>

Table 5: Participation

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Percent of Speaking Instances</i>				
Percent of Women on Committee	-0.015 (0.130)	0.009 (0.124)	-0.012 (0.067)	-0.009 (0.064)
Constant	0.050 (0.071)	0.041 (0.094)	0.069* (0.016)	0.059* (0.020)
<i>Panel B: Percent of Words Spoken</i>				
Percent of Women on Committee	-0.054 (0.124)	-0.038 (0.116)	-0.004 (0.065)	-0.000 (0.063)
Constant	0.036 (0.066)	0.031 (0.090)	0.077* (0.015)	0.072* (0.020)
<i>Panel C: Percent of Hearings Spoken In</i>				
Percent of Women on Committee	0.159 (0.246)	0.187 (0.239)	-0.046 (0.100)	-0.036 (0.098)
Constant	0.467* (0.088)	0.473* (0.122)	0.460* (0.029)	0.461* (0.032)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses. * indicates $p < .05$.

Interestingly, the percent of women on a committee does not have a statistically significant effect on how often women speak, the number of words they speak, or the percent of hearings they speak in. Likewise, the percent of women on a committee is not a statistically significant predictor of these outcomes for men. These results suggest that gender imbalance generally does not affect how women or men participate in committees.

These null findings may have to do with the House rules governing committee hearings. As previously discussed, House rules guarantee a minimum five minute period in each committee hearing for each member who wishes to speak – these rules may, in fact, “level the playing field” for men and women on the committee by ensuring that everyone who wishes to participate does indeed get the chance to do so, regardless of gender. Our results suggest that the percent of women present on committee does not affect the rates at which women and men seem to be taking advantage of

this chance.

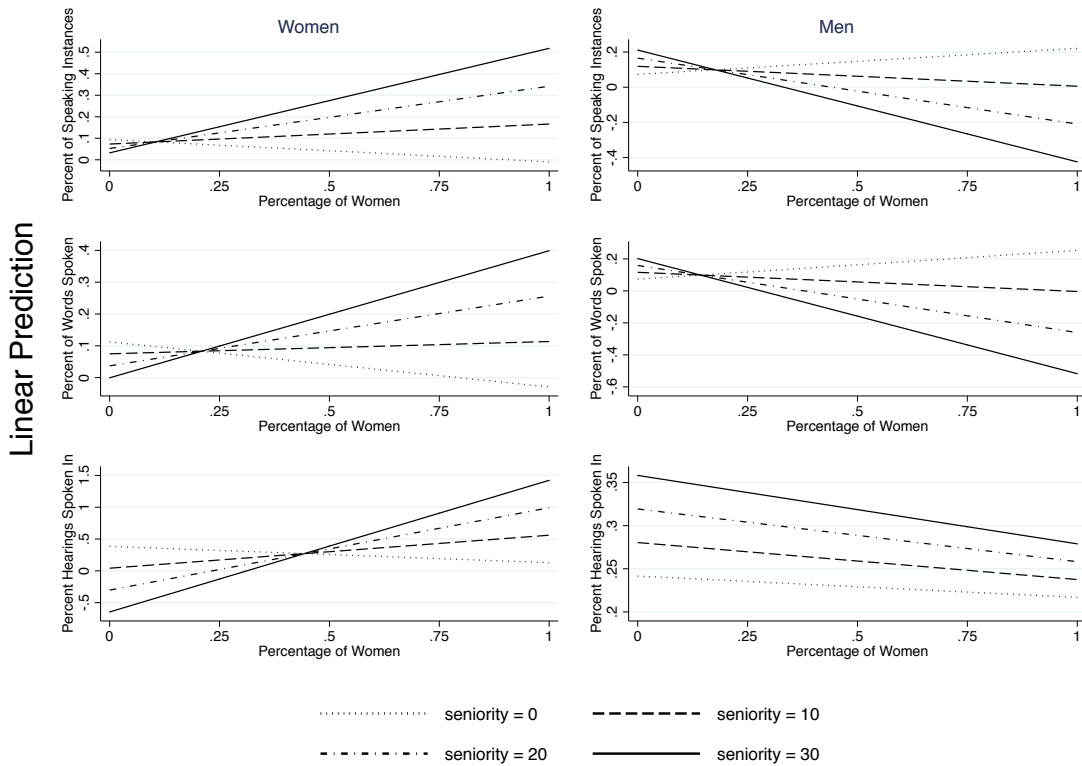
However, it may also be the case that there is hidden heterogeneity. Although we control for seniority in the above regression, experience in the chamber may interact with the percentage of women on the committee. While low seniority women may feel more comfortable speaking when there are more women present, it is unclear how high seniority women and men generally will or will not alter their participation patterns. For example, high seniority members may feel more comfortable taking the lead. Alternatively, they may prefer to leave hearing deliberations to the low seniority members in order to focus on more influential activities. To investigate these possibilities, we re-run the above regression and interact “Percentage of Women on Committee” with “Seniority.” The results are presented in Table 6. Because continuous by continuous interactions can be difficult to interpret, we also plot the simple slopes for “Percentage of Women on Committee” at different values of “Seniority” in Figure 5. Including this interaction term in the regression does reveal significant results. While the null results persist for women across all three dependent variables, men speak significantly fewer times and significantly fewer words as their seniority and the percentage of women on the committee increases. However, the percent of women does not appear to affect the percent of hearings that men speak in.

Table 6: Participation and Seniority

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Percent of Speaking Instances</i>				
Percent of Women on Committee	-0.206 (0.196)	-0.103 (0.193)	0.120 (0.112)	0.148 (0.108)
Percent of Women on Committee × Seniority	0.034 (0.025)	0.020 (0.025)	-0.022 (0.013)	-0.026* (0.012)
Constant	0.081 (0.076)	0.056 (0.089)	0.049* (0.018)	0.038 (0.022)
<i>Panel B: Percent of Words Spoken</i>				
Percent of Women on Committee	-0.217 (0.179)	-0.142 (0.169)	0.158 (0.109)	0.180 (0.106)
Percent of Women on Committee × Seniority	0.029 (0.023)	0.018 (0.023)	-0.027* (0.012)	-0.030* (0.011)
Constant	0.056 (0.072)	0.044 (0.085)	0.053* (0.018)	0.049* (0.021)
<i>Panel C: Percent of Hearings Spoken In</i>				
Percent of Women on Committee	-0.319 (0.318)	-0.256 (0.320)	-0.044 (0.141)	-0.025 (0.139)
Percent of Women on Committee × Seniority	0.084 (0.052)	0.078 (0.050)	-0.000 (0.018)	-0.002 (0.018)
Constant	0.514* (0.129)	0.531* (0.130)	0.462* (0.032)	0.460* (0.035)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses. * indicates $p < .05$.

Figure 5: Predictive Margins



Similarly, gender imbalance may interact with majority party status. Majority party members may be more comfortable talking in hearings generally, magnifying the benefits of additional women on a committee. The results from this analysis are presented in Table 7. The interaction terms in columns one and two of the top two panels are significant and positive, suggesting that majority party women speak significantly more times and words as the percentage of women on the committee increases. The base term is not significant in either regression, indicating that the participation patterns of minority party women do not change with the presence of women on committees. Additionally, none of the coefficients are significant in the regressions subsetted to men, suggesting that men do not exhibit the same variation by party status as women do.

Table 7: Participation and Majority Party Status

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Percent of Speaking Instances</i>				
Percent of Women on Committee	-0.122 (0.132)	-0.114 (0.131)	-0.064 (0.086)	-0.044 (0.084)
Percent of Women on Committee \times Majority	0.395* (0.190)	0.367* (0.185)	0.081 (0.083)	0.061 (0.080)
Constant	0.055 (0.070)	0.067 (0.095)	0.054* (0.017)	0.065* (0.021)
<i>Panel B: Percent of Words Spoken</i>				
Percent of Women on Committee	-0.160 (0.123)	-0.159 (0.122)	-0.063 (0.084)	-0.045 (0.081)
Percent of Women on Committee \times Majority	0.376* (0.168)	0.359* (0.171)	0.096 (0.079)	0.077 (0.076)
Constant	0.043 (0.065)	0.057 (0.091)	0.069* (0.017)	0.079* (0.021)
<i>Panel C: Percent of Hearings Spoken In</i>				
Percent of Women on Committee	0.048 (0.255)	0.069 (0.255)	-0.031 (0.109)	-0.010 (0.109)
Percent of Women on Committee \times Majority	0.362 (0.231)	0.351 (0.221)	-0.029 (0.116)	-0.045 (0.116)
Constant	0.478* (0.088)	0.499* (0.121)	0.449* (0.029)	0.457* (0.033)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses. * indicates $p < .05$.

In addition to rates of participation, gender imbalances may have an effect on the substance of that participation. We investigate whether this is the case with our second set of outcome variables that focus on the sentiment of members' speech in committee hearings. It may be the case that adding additional women to congressional committees changes the emotional atmosphere. While it may increase the number of positive words spoken, as it has been shown that female legislators are better at cooperating than their male peers (Volden, Wiseman, and Wittmer 2013), it may also increase negativity if there are underlying negative reactions to an increasing number of women.

Table 8 is similarly set up as Table 5 but now reports the coefficient estimates for two sentiment

outcome variables: the percent of a member’s words that are positive and the percent of a member’s words that are negative. Panel A shows the results for positive words spoken and Panel B shows the results for negative words spoken. The coefficients are similar across the panels, as they are all small in magnitude and not statistically significant. The results without the interaction term and interacted with majority party status are included in Tables A.1 and A.2 in the Supplementary Materials. Seniority and majority party status do not appear to interact with gender imbalance in significant ways for sentiment.

Table 8: Sentiment

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Positive Speech</i>				
Percent of Women on Committee	-0.002 (0.007)	-0.002 (0.007)	-0.002 (0.003)	-0.002 (0.003)
Constant	0.026* (0.005)	0.024* (0.006)	0.026* (0.001)	0.026* (0.001)
<i>Panel B: Negative Speech</i>				
Percent of Women on Committee	-0.003 (0.006)	-0.003 (0.005)	-0.001 (0.003)	-0.001 (0.003)
Constant	0.011* (0.002)	0.016* (0.003)	0.014* (0.001)	0.013* (0.001)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses. * indicates $p < .05$.

Despite these largely null results, it may be the case that it isn’t positive or negative sentiment that is changing, but rather aggression or other forms of cooperative behavior. Table 9 looks specifically at a member’s use of aggressive words. Results with the interactions are included in Tables A.3 and A.4 in the Supplementary Materials. We do not find a statistically significant effect of the percent of women on a committee on this outcomes.

Table 9: Aggression

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Aggressive Speech</i>				
Percent of Women on Committee	0.013 (0.009)	0.013 (0.009)	-0.012 (0.010)	-0.012 (0.010)
Constant	0.015* (0.003)	0.016* (0.005)	0.020* (0.001)	0.020* (0.001)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses.
* indicates $p < .05$.

Conclusion

This study examines how the gender composition of congressional committees affects the extent to which women and men participate in policy discussions and deliberations. To test this relationship, we utilize several new measures of involvement in committee hearings, including speech patterns and content analysis, as outcomes in a generalized difference-in-difference design. The results reveal that men and women do exhibit certain differences in behavior after the proportion of women on a committee changes, with these differences varying based upon the seniority and majority party status of the member. More specifically, the results suggest that when it comes to the amount of participation in committees, women in Congress are affected by gender ratios and majority rule only when they are in the majority group. Alternatively, high seniority men exhibit a negative reaction, indicating an interesting interaction of gender and power in Congress that warrants further investigation, as seniority is often correlated with power in Congress.

Future research should also focus on examining and accounting for the selection of women into Congress. Women who have already faced substantial gender-based adversity in their election may react differently than women who did not face similar obstacles. Additionally, it may be the case that a higher number of women is necessary for there to be a detectable effect on sentiment and

aggression. If this is the case, our data would be unable to reveal such an effect. Finally, future research should focus on expanding the outcome variables beyond patterns of speech. For example, what are the topics that elected officials discuss, and how do those topics change in response to the proportion of women on the committee? While many previous studies have analyzed the sponsorship patterns of female legislators, few have questioned how these patterns vary in response to the number of women present.

Overall, this paper is the first to investigate how and when the proportion of women on congressional committees matters for the production of policy. As a result, the findings from this paper have important implications for the congressional and descriptive representation literature. We find that while it initially appears that participation rates are not affected by gender imbalance, further analysis does reveal heterogeneity by majority party and seniority status. However, we do not find evidence of any change in participation *styles*. On the whole, gender imbalance appears to affect how women participate in the policy-making process, suggesting that numerical representation does serve as an important vehicle for descriptive representation in Congress.

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A Supplementary Materials

Table A.1: Sentiment and Seniority

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Positive Speech</i>				
Percent of Women on Committee	-0.016 (0.014)	-0.017 (0.014)	-0.002 (0.006)	-0.002 (0.006)
Percent of Women on Committee \times Seniority	0.002 (0.002)	0.003 (0.002)	0.000 (0.001)	0.000 (0.001)
Constant	0.026* (0.005)	0.025* (0.006)	0.026* (0.001)	0.027* (0.002)
<i>Panel B: Negative Speech</i>				
Percent of Women on Committee	-0.005 (0.011)	-0.004 (0.011)	-0.002 (0.004)	-0.003 (0.004)
Percent of Women on Committee \times Seniority	0.000 (0.001)	0.000 (0.001)	0.000 (0.000)	0.000 (0.000)
Constant	0.013* (0.003)	0.016* (0.004)	0.014* (0.001)	0.014* (0.001)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses.
* indicates $p < .05$.

Table A.2: Sentiment and Majority Party Status

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Positive Speech</i>				
Percent of Women on Committee	-0.007 (0.008)	-0.007 (0.008)	-0.004 (0.004)	-0.004 (0.004)
Percent of Women on Committee \times Majority	0.014 (0.011)	0.014 (0.010)	0.005 (0.004)	0.005 (0.004)
Constant	0.026* (0.004)	0.025* (0.006)	0.027* (0.001)	0.027* (0.001)
<i>Panel B: Negative Speech</i>				
Percent of Women on Committee	-0.005 (0.007)	-0.006 (0.006)	0.002 (0.004)	0.001 (0.004)
Percent of Women on Committee \times Majority	0.007 (0.008)	0.008 (0.008)	-0.004 (0.003)	-0.004 (0.003)
Constant	0.012* (0.002)	0.017* (0.003)	0.014* (0.001)	0.013* (0.001)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses.
* indicates $p < .05$.

Table A.3: Aggression and Seniority

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Aggressive Speech</i>				
Percent of Women on Committee	0.002 (0.019)	0.002 (0.018)	-0.014 (0.015)	-0.015 (0.015)
Percent of Women on Committee \times Seniority	0.002 (0.002)	0.002 (0.002)	0.000 (0.001)	0.001 (0.001)
Constant	0.016* (0.004)	0.018* (0.006)	0.020* (0.002)	0.021* (0.002)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses.
* indicates $p < .05$.

Table A.4: Aggression and Majority Party Status

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Aggressive Speech</i>				
Percent of Women on Committee	0.020*	0.019	-0.014	-0.013
	(0.010)	(0.010)	(0.014)	(0.014)
Percent of Women on Committee \times Majority	-0.018	-0.016	0.003	0.002
	(0.016)	(0.016)	(0.008)	(0.008)
Constant	0.014*	0.015*	0.020*	0.020*
	(0.003)	(0.005)	(0.002)	(0.002)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses. * indicates $p < .05$.

Table A.5: Participation, Count of Women

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Percent of Speaking Instances</i>				
Count of Women on Committee	-0.002	-0.001	0.000	-0.000
	(0.003)	(0.003)	(0.001)	(0.001)
Constant	0.059	0.047	0.068*	0.059*
	(0.068)	(0.091)	(0.015)	(0.020)
<i>Panel B: Percent of Words Spoken</i>				
Count of Women on Committee	-0.002	-0.002	0.000	0.000
	(0.002)	(0.002)	(0.001)	(0.001)
Constant	0.045	0.038	0.075*	0.071*
	(0.063)	(0.088)	(0.015)	(0.019)
<i>Panel C: Percent of Hearings Spoken In</i>				
Count of Women on Committee	-0.002	-0.002	-0.002	-0.002
	(0.003)	(0.003)	(0.002)	(0.002)
Constant	0.504*	0.501*	0.468*	0.469*
	(0.087)	(0.124)	(0.028)	(0.032)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses. * indicates $p < .05$.

Table A.6: Sentiment, Count of Women

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Positive Speech</i>				
Count of Women on Committee	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Constant	0.026* (0.004)	0.024* (0.006)	0.026* (0.001)	0.026* (0.001)
<i>Panel B: Negative Speech</i>				
Count of Women on Committee	-0.000 (0.000)	-0.000 (0.000)	0.000 (0.000)	0.000 (0.000)
Constant	0.012* (0.002)	0.016* (0.003)	0.013* (0.001)	0.013* (0.001)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses.
* indicates $p < .05$.

Table A.7: Aggression, Count of Women

	Women		Men	
	(1)	(2)	(1)	(2)
<i>Panel A: Aggressive Speech</i>				
Count of Women on Committee	0.000 (0.000)	0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)
Constant	0.016* (0.003)	0.017* (0.005)	0.019* (0.001)	0.020* (0.001)
All Controls		✓		✓
Member-Committee fixed effects	✓	✓	✓	✓
Congress fixed effects	✓	✓	✓	✓
Observations	912	912	5342	5342

Note: Entries are linear regression coefficients with standard errors clustered on member-committee in parentheses.
* indicates $p < .05$.