

Toll of Trolls: Gendered Online Hostility and its Impact on Women's Political Ambition

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Abstract

There is a great need to understand how politicians experience online hostility, and what consequences exposure to this hostility has on women in office. This paper addresses two puzzles in the literature: whether women politicians face disproportionate abuse online, and whether such abuse decreases their political ambition. By pairing a novel method of distinguishing gendered hostility from general hostility in tweets directed to politicians with hand-collected panel data on the career decisions of 1,247 U.S. state legislators across four election cycles, I shed new light on both debates. I demonstrate that the predominant narrative that women and men politicians experience similar online environments is not true after accounting for the gendered content of abuse. Further, contrary to the widespread expectation that online hostility drives incumbent women from politics, I show that women's political ambition is resilient to gendered hostility. Although women politicians receive more severe and gender-based online hostility than men, they are less likely than men to exit office in response. These findings suggest a gender-based selection effect, where only the most thick-skinned women pursue political office.

Keywords: violence against women in politics, ambition, social media, machine learning, representation

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In recent years, many women politicians have reported high levels of online abuse and called on social media companies to protect them (Brown 2021; CCDH 2024; Frankel 2020; IPU 2018; Phillips 2017). Politicians and political scientists alike theorize that the motive behind such abuse is to push women out of political office. In 2020, a hundred global women lawmakers signed a letter to Facebook where they stated that gendered hostility on the platform was intended to silence women and undermine democracy (Frankel 2020). An extensive number of academic publications have echoed this concern, theorizing that online hostility may be eroding women's descriptive representation by raising the costs of holding office (Carson et al. 2024; Erikson et al. 2023; Harmer and Southern 2023; Herrick and Franklin 2019; Herrick and Thomas 2022; Håkansson 2024; Håkansson and Lajevardi 2024; Jankowicz 2017; Kosiara-Pedersen 2023; Krook 2017, 2020; Sobieraj 2018; Thomas et al. 2019; Wagner 2022).

Despite the attention scholars have dedicated toward understanding online hostility against politicians, two central questions remain. First, do women politicians receive disproportionate abuse on social media platforms? Observational studies and survey-based research consistently yield contrasting results. Computational text analyses often conclude that men politicians receive a higher volume of online abuse (Fuchs and Schäfer 2021; Gorrell et al. 2020; Greenwood et al. 2019; Theocharis et al. 2020; Ward and McLoughlin 2020), while politicians' self-reported accounts consistently suggest the opposite pattern of women experiencing more online hostility (Collignon and Rüdig 2020; Herrick and Thomas 2022; Herrick et al. 2019; Håkansson 2021; Pathé et al. 2013; Zeiter et al. 2019). I argue that this existing discrepancy stems from a mismatch in what each method captures. While self-reports often reflect the content and impact of abuse, large-scale text analyses generally measure only the volume of hostile messages. Drawing on gender role congruity theory, which frames online hostility as a form of backlash against women who violate traditional gender roles (Eagly and Karau 2002; Felmlee et al. 2020; Krook and Restrepo Sanín 2016; Wilhelm and Joeckel 2019), I hypothesize that gender-motivated abuse toward women politicians will manifest in specifically gendered *content* rather than simply higher *volumes* of abuse (Bardall et al. 2020; Erikson et al. 2023; Holm et al. 2024).

The second question is whether women politicians are disproportionately curtailing their political careers in response to such abuse. Survey and interview data suggest that women politicians are more likely than men to reduce their public engagement and even consider exiting office after experiencing online hostility (Erikson et al. 2023; Herrick and Franklin 2019; Håkansson and Lajevardi 2024; Ramachandran et al. 2024). Yet a growing body of work suggests that women who enter politics correctly anticipate gendered hostility and discrimination (Fox and Lawless 2024; Kjøller and Pedersen 2025; Shames 2017). Gender-

based selection theory suggests the women who do make it into office will be particularly resilient to abuse as a result, treating online hostility as one more hurdle alongside other gendered costs of political careers (Anzia and Berry 2011a; Bauer 2020b; Bauer and Cargile 2023; Butler et al. 2022; Eatough and Preece 2025; Fulton 2012a; Lazarus and Steigerwalt 2018,?; McGrath et al. 2025; Schmitt and Brant 2019; Thomsen and Sanders 2020).

To address these questions, I collect all the public tweets referencing all lower-house state representatives on Twitter between 2015 – 2018. I identify hostile and gendered content using a replicable and cost-effective approach that combines human coding, GPT4 zero-shot classification, and fine-tuning a pre-trained BERT model. I examine the influence of online hostility on ambition by linking measures of exposure to panel data on 1,247 politicians (370 women, 913 men) across four election cycles (2015–2023). Specifically, I measure how much – and what type of – online hostility each politician encountered in the six months prior to the campaign filing deadlines, and whether this influenced their decisions to campaign for reelection, a different office, or not at all.

The results bring clarity to both puzzles. When computational text analysis incorporates gendered language, it produces findings that closely align with women’s self-reported experiences (Bjarnegård et al. 2022; Erikson et al. 2023; Kosiara-Pedersen 2023). I find that although men and women experience similar levels of general hostility, women experience nearly twice as much gender-based hostility. Notably, gender-based hostility intensifies when women politicians deviate further from expected gender norms of behavior, consistent with gender role congruity theory. Yet despite this disproportionate burden, women are significantly less likely than men to exit office in response to either gendered or general hostility. This result is robust across a variety of specifications. Instead, women respond to increased exposure by campaigning for a different office than they currently hold, which may indicate an adaptive strategy to mitigating the effects of online abuse.

This paper makes two primary contributions. First, I revise the widespread view that men and women politicians encounter similar online environments by accounting for the gendered content of abuse. Women receive nearly twice as much gender-based hostility as men, aligning computational analyses with women’s self-reported experiences. Second, I show that women’s political ambition is more resilient to both gendered and general hostility than is often assumed. Taken together, these findings revise two influential narratives in the literature and offer a more unified account of gendered online violence and ambition: women politicians do face more severe and gender-based hostility than men, but they are less likely than men to exit in response, often adapting instead by seeking new offices.

Part 1: Do Women Receive More Online Hostility than Men?

I begin with analyzing the first question of whether women and men politicians experience similar hostility online. Understanding why trolls would want to disproportionately target women politicians leads me to hypothesize that women politicians will receive more gender-based abuse. The results support this hypothesis.

Why Does Visibility Matter?

Although self-reported and observational studies of gendered online hostility often diverge in their findings, they do show consistent agreement that high-profile women receive more abuse than similarly prominent men ([Guerin and Maharasingam-Shah 2020](#); [Holm et al. 2024](#); [Håkansson 2021](#); [Oates et al. 2019](#); [Rheault et al. 2019](#)). As visibility increases – whether in media appearances, office status, or social media followers – a gender gap in online abuse emerges. This recurring pattern suggests a rare point of alignment between methods, with visibility helping to explain when and why women politicians face disproportionate online hostility.

Role congruity theory offers a valuable framework for understanding why visible women politicians receive more online hostility than their less visible peers ([Rheault et al. 2019](#)). In societies that excluded women from public life, the traits linked to competent leadership – assertive, confident, dominant, ambitious – have been historically coded as masculine ([Eagly and Karau 2002](#); [Eagly et al. 1992](#); [Heldman et al. 2018](#); [Katz 2016](#)). Women who exhibit the desirable “masculine” leadership traits – including political ambition – may be perceived as threats to the standing social order and penalized ([Brescoll et al. 2018](#); [Eagly and Karau 2002](#); [Fulton 2012b](#)). This role-incongruity helps explain why women politicians experience unique harassment. Women’s presence in public life, particularly in positions of power, can be perceived as violating gender norms ([Eagly and Karau 2002](#)). Researchers conceptualize online and offline violence against women in politics (VAWiP) as a form of backlash against women who violate traditional gender roles ([Eagly and Karau 2002](#); [Felmlee et al. 2020](#); [Krook and Restrepo Sanín 2016](#); [Wilhelm and Joeckel 2019](#)).

There are at least two mechanisms by which visibility may intensify the perception that women in positions of power are violating gender norms. First, high-profile women may attract more abuse because increased visibility exposes them to a larger audience, heightening the number of observers who choose to act on gender biases ([Rheault et al. 2019](#)). In this view, all women politicians engage in role-incongruent behavior, but visibility increases

the salience of this deviation and the likelihood that others will respond to it (Krook and Restrepo Sanín 2016; Mansbridge and Shames 2008).

Second, some observers may infer that women who attain public notability are substantially more role-incongruent than their less visible peers. Achieving prominence in politics often requires demonstrating high levels of ambition, assertiveness, and confidence: traits historically associated with masculinity (Eagly and Carli 2003; Folke and Rickne 2016; Okimoto and Brescoll 2010). Whether or not prominent women exhibit these traits, their visibility may lead observers to perceive them as more agentic and, therefore, as more norm-violating than less visible women politicians (Håkansson 2021). In this view, visibility does not merely amplify awareness of a norm violation; it intensifies perceptions of that violation by signaling a deeper departure from stereotypical femininity.

These two mechanisms are observationally equivalent and likely mutually reinforcing. Recognizing that visibility amplifies the gender role-incongruity that triggers backlash helps explain why text-based approaches tend to detect greater hostility toward women only among the most visible politicians (Guerin and Maharasingam-Shah 2020; Oates et al. 2019; Rheault et al. 2019). Understanding the link between visibility and gender role-incongruity underscores the need for text-based research to engage more fully with online abuse as a form of gendered violence.

Gendered Backlash Takes Gendered Forms

I argue that applying the gender role congruity framework can help resolve the discrepancy between self-reported and text-based findings on whether online hostility toward politicians is gendered. In particular, role congruity theory would suggest the need to look at gendered forms of hostility in abuse targeting women politicians. Violence against women in politics differs from general political violence through gendered motives, forms, or impacts (Bardall et al. 2020). Bardall et al.(2020) argue that a higher volume of online hostility directed at women may signal gendered motives. As discussed above, research comparing the frequency of abuse toward men and women politicians produces divergent findings depending on the methodological approach. Self-reported data often indicate greater volumes of abuse toward women, whereas observational studies frequently find the opposite, with the important exception that such studies consistently detect disproportionate hostility directed at the most visible women in politics (Holm et al. 2024).

In contrast, self-reported data provides strong evidence for gendered forms of abuse (Bardall et al. 2020). Women politicians self-report higher rates of sexualized harassment, gender-based hate speech, and sexist abuse than men (Bjarnegård 2018; Erikson et al. 2023;

Esposito and Breeze 2022; Herrick et al. 2022; Holm et al. 2024; Kosiara-Pedersen 2023). Computational text analyses that examine gendered content find the same pattern (Gorrell et al. 2020; Southern and Harmer 2019; Ward and McLoughlin 2020). Understanding visibility as a proxy for gender role-congruity helps explain why observational researchers find support for gendered motives in the backlash against high-profile women (Bardall et al. 2020; Rheault et al. 2019). The same logic suggests that gendered forms of abuse are also more likely to appear when women deviate from traditional gender expectations (Bardall et al. 2020; Erikson et al. 2023).

The choice to center criticisms of women politicians on their sex and gender rather than their behavior reflects a deep discomfort with women in power. Gendered hostility is one way to penalize women who deviate from their circumscribed roles by occupying positions of power (Brescoll et al. 2018; Eagly and Karau 2002). Online violence against women in politics (VAWiP) degrades and dehumanizes women through sexist tropes. Linguists observe that English speakers reduce women to edible, nonhuman, and sexual entities by comparing women to animals (“bitch”), foods (“peach”), or sex workers (“whore”) (Montell 2019). Dovi (2025) categorizes the depictions of women politicians as physically disgusting, morally bankrupt, or contaminated by their presence in politics as “nasty claims”. Similarly, Skubic (2025) identifies recurring VAWiP tropes that domesticate, objectify, sexualize, or dehumanize women as animals. Despite the variation in terminology, the central theme to emerge across a plethora of schemas is the incorporation of gender and sex into hostility targeting women. A woman political activist described the abuse as “it’s always gender and it’s always sexualized, whether or not the thing they’re mad about is about gender and sex” (Sobieraj 2020).

Although gender-based hostility targets individual politicians, the message is about the role of women in politics broadly. This is illustrated clearly in Jane (2018), which showcases the formulaic and impersonal components of online hate speech toward women. By emphasizing a woman’s gender, trolls imply her flaws are tied to her sex classification – and therefore activate role congruity biases that all women are unfit for political office (Dovi 2025,?; Krook and Restrepo 2019; Krook 2020; Montell 2019; Sobieraj 2020).¹

I extend existing research on online VAWiP by examining gendered language outside hostile contexts. Some messages use forms of gendered language in explicitly supportive messaging, such as the hashtag #Vote4Women. Nevertheless, by heightening the salience of a politicians gender, even well-intentioned gendered language may inadvertently activate

¹ This is not the case for gendered hostility against men because the presence of men in politics is congruent with gender expectations (Clayton et al. 2024). Thus, gendered attacks against an individual man do not transfer to taint other men’s perceived competence (Dovi 2025).

stereotypic expectations associated with gender roles (Bigler and Leaper 2015). For example, calls to elect more women, as expressed in #Vote4Women, may subtly reinforce the perception of women candidates as interlopers in a man's domain (Puwar 2004). In light of this, I analyze how non-hostile gendered language may still communicate gender norms online.

Drawing on the literature on gendered violence, I expect that backlash to perceived gender role violations will manifest in gendered forms (Bardall et al. 2020; Erikson et al. 2023). I focus on visibility as an existing proxy for role-incongruity (Håkansson 2021; Rheault et al. 2019) and introduce two novel indicators - legislator tone and the presence of women in the chamber - to further validate the relationship between gendered behavior and content.

I expect the following:

H1: Visible women receive more hostile and non-hostile-gendered content than less visible women and similarly visible men.

H2: Women who deviate more from gender roles receive more hostile and non-hostile-gendered content than conforming women.

H3: The online environment between men and women will differ more in gendered hostility than in general hostility.

Measuring Hostile and Gendered Content

I examine hostile and gendered language toward men and women state representatives with differing levels of visibility. This study is the first to apply computational text analysis to social media data to examine online hostility directed at subnational politicians in the US. The comparatively low visibility of state legislators relative to members of Congress makes them a valuable test case for the relationship between political visibility and gender-based abuse. The identification of systematic gendered patterns in this setting strengthens the claim that such abuse is widespread and structurally embedded. As women ascend to higher office, they typically become more visible and less role congruent, suggesting that abuse may intensify with political power.

I scraped all the public tweets² toward 3,399 lower-house state representatives that were available in August 2022 and originated between October 2015 and July 2018.³ This time

² Mentions are public tweets which tag the legislator by including their handle.

³ Butler et al. (2023) found that 71% of women state representatives in 2017 had a Twitter account compared to 60% of men. Democratic representatives in 2017 were also slightly more likely to have a Twitter account than Republican representatives.

frame covers the campaign period and the full legislative term. The resulting corpus has over three million tweets. The Twitter handles for the representatives were collected by [Butler et al. \(2023\)](#). Butler et al. analyzed the tweets these state representatives posted during the timeframe, allowing me to control for the legislator’s behavior on Twitter.

I utilized hand coding, zero-shot classification, and BERT feature representation to label the Twitter corpus for hostile and gendered content. I first classify the mentions with the ‘gpt-4’ model on the OpenAI API.⁴ A team of expert coders given identical instructions to GPT-4 validate the zero-shot classification labels.⁵ Next, I used the training corpus to finetune a pre-trained BERT model.⁶ Validation of these labels indicated high accuracy and convergence.⁷ A full description of this process is available in the Supplementary Materials.

Briefly, I consider a mention “hostile” if it contains impolite, rude, derogatory comments, vulgarities, threats, hate speech, dismissive tones, sexual harassment, racism, ad hominem attacks, or calls for a legislator’s resignation. A mention is “gendered” if it references a legislator’s physical appearance, relationship status, parental role, competence based on gender, utilizes gendered pejoratives, comments on stereotyped gender traits, or directly mentions the legislator’s gender. Table 1 shows a randomly chosen tweet from each combination of labels. These confirm that GPT-4 accurately picks up on hostile and gendered content.

Results

I test my hypotheses using three dependent variables: the percentage of received mentions that are hostile (*% Hostile*), the percentage of hostile mentions that are gendered (*% Hostile Gendered*), and the percentage of mentions that are gendered but not hostile(*% Gendered, Not-Hostile*). My independent variable of interest is the interaction between *Woman* and *Visibility*.

I follow the literature and measure a legislator’s *Visibility* by the number of mentions she receives ([Cha et al. 2010](#); [Gorrell et al. 2020](#); [Rheault et al. 2019](#); [Theocharis et al. 2020](#); [Ward and McLoughlin 2020](#)). The number of mentions a legislator receives in this time frame

⁴ Before labeling the data, I removed all handles except the target legislator’s in the text and replaced the legislator’s handle with @legislator. The OpenAI annotation was conducted on August 15, 2023, with a model temperature of 0 to facilitate deterministic output. The expert coders annotated between August 6 and 9, 2023.

⁵ The ICR between the zero-shot and expert classification for the hostile label is 0.89, and the F1 score is 0.75. The ICR for the gendered label is 0.93, and the F1 score is 0.74. These scores indicate that the zero-shot model has a relatively good balance between precision and recall.

⁶ The HateBERT model was pre-trained on banned Reddit posts, making it ideal for detecting hostile content in Twitter mentions ([Caselli et al. 2021](#)). A pre-trained BERT model for gendered content does not exist. Instead, I use BERTweet to label the corpus for gendered content ([Nguyen et al. 2020](#)).

⁷ A team of expert coders validated the BERT results. Both models are highly accurate, with an F1 score of 0.77 for hostility and 0.81 for gendered content.

Table 1: Zero-shot Labels Show High Face Validity

Tweet	Gendered?	Hostile?
“Representative @legislator calls for an in-depth review of our transportation funding. #msleg”	0	0
“I proudly donated to and @legislator yesterday! Why? Because I know these phenomenal women will get the job done! #BlackWomenLead #ElectBlackWomen”	1	0
“@legislator You had a chance to help make the plan better and you blew up negotiations. Was it so you could complain for political reasons?”	0	1
“ hey hey ho ho this bitch @legislator needs to go!”	1	1

correlates strongly with her legislative leadership position, how often the news references her, and how many times she is searched for on Google (see Supplementary Materials, part C). I control for the legislator’s partisanship, ideology, and behavior on Twitter. I model the relationship with linear regression and include state-fixed effects with robust errors.⁸

Women Receive Disproportionate Gender-Based Content

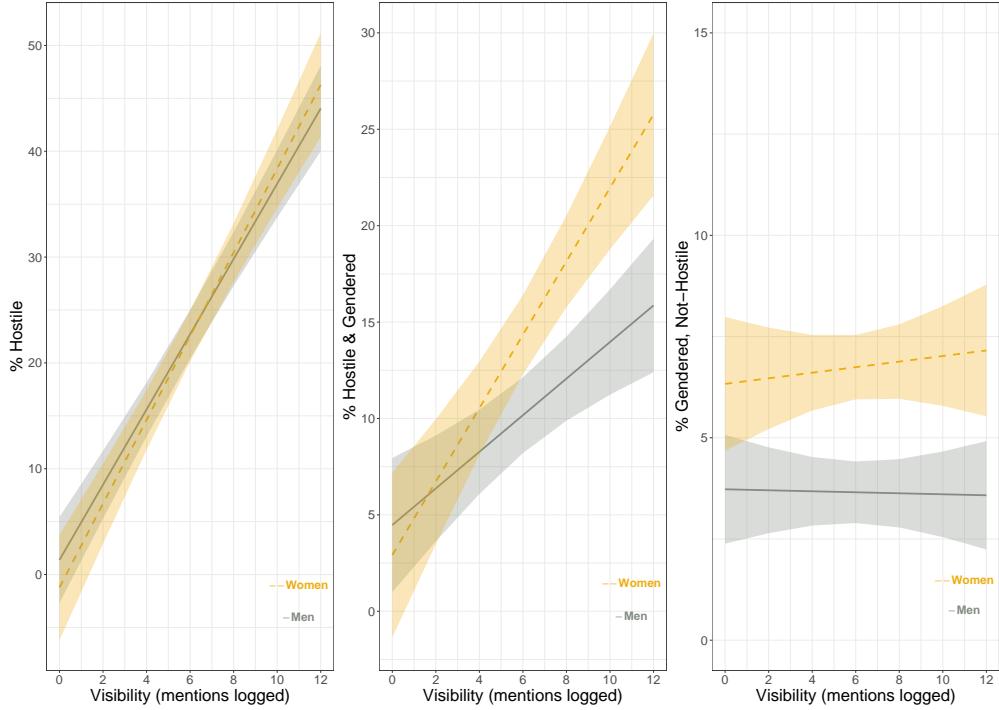
Figure 1 illustrates the importance of considering gendered content when evaluating the online environments of men and women politicians. The leftmost plot depicts the positive relationship between *Visibility* and *% Hostile*. Had I followed much of the computational text analysis literature in examining solely the frequency of online abuse, I would conclude that trolls do not disproportionately target women in politics. The central plot in Figure 1 belies the error in this conclusion.

Going from low to high *Visibility* increases a woman’s percentage of hostile mentions with gendered content by ~ 22 percentage points and a man’s by ~ 10 . At the highest levels of *Visibility*, a full quarter of the hostility women receive relates to their gender, compared to 15% for men. Visible women also receive more non-hostile gendered content than less visible women and similarly visible men. The much smaller y-axis in the rightmost panel suggests that gendered content is more likely to appear in hostile than non-hostile messaging. These results support my hypothesis that visible women receive more hostile and non-hostile gendered content than less visible women and similarly visible men (**H1**).

These findings illuminate the unique challenges women in politics endure because of

⁸ The proportion of women in each state’s legislative chamber varies across states but remains constant over the study period. As a result, state-fixed effects capture this cross-sectional variation.

Figure 1: Visibility Impacts Gender-Based Content for Women



Note: The x-axis shows *Visibility*, measured as the logged number of mentions a legislator received (e.g., a score of x equals 10^x mentions). From left to right, the y-axes represent the percentage of (1) mentions that were hostile, (2) hostile mentions that were gendered, and (3) mentions that were gendered but not hostile. I obtained the predicted values from Table A.1 in the Supplementary Materials.

gender role expectations. Gender-based hostility is a form of semiotic violence that challenges the right of women to participate in politics (Krook and Restrepo 2019). As such, the damaging effects of gendered-hostility extend far beyond the individual targets to undermine democracy itself (Frankel 2020; Holm et al. 2024; Sobieraj 2020).

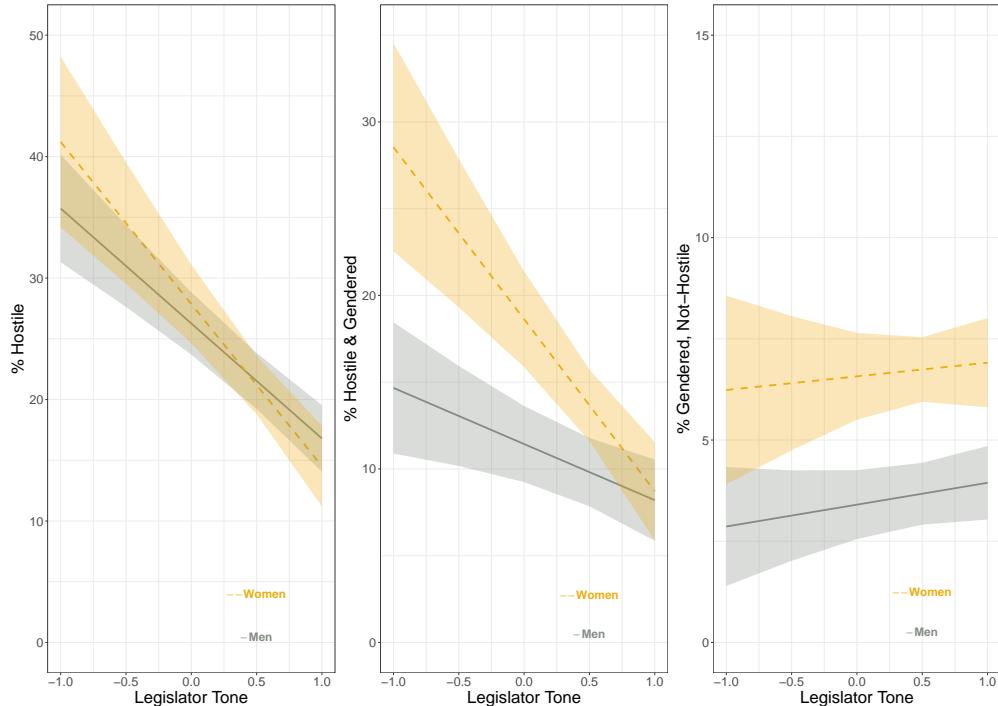
Role-Incongruity Correlates with Gendered Content

I theorized that if a backlash against visible women took the form of gendered content, this would further support the conceptualization of public visibility as violating gender role expectations for women politicians (Rheault et al. 2019). The results support this theory by indicating that online hostility toward visible women state representatives takes the gendered form of disparate content rather than volume. To lend further support to the centrality of gender role congruity in online VAWiP, I demonstrate that backlash toward two other forms of gender role-incongruity also takes the form of gendered-hostility rather than an increased frequency of generic hostility.

The first alternate measure of gender role congruity is the positive or negative tone of the

legislator's tweets during this time frame.⁹ Many citizens still expect women in politics to express a more positive viewpoint than men (Bauer 2020a). Consistent with this expectation, women legislators in the dataset tweeted more positively than their partisan counterparts (Butler et al. 2023), and women members of Congress posted more images of themselves as happy than neutral or upset (Boussalis et al. 2022).

Figure 2: Women's Tone Corresponds with the Gendered Content They Receive



Note: The x-axis shows Legislator Tone, ranging from -1 (entirely negative) to 1 (entirely positive), with 0 indicating neutrality. From left to right, the y-axes represent the percentage of (1) mentions that were hostile, (2) hostile mentions that were gendered, and (3) mentions that were gendered but not hostile. I obtained the predicted values from Table A.2 in the Supplementary Materials.

Women tweeting in a non-positive tone are thus using a communication style that is incongruent with traditional gender roles. As shown in Figure 2, the corresponding backlash is evident in the content rather than the volume of their hostile mentions. Legislators who express positive emotions tend to receive less hostility. However, women who tweet in a negative – or even neutral– tone receive *double* the percentage of hostile-gendered content that negative men do. Again, gendered content is expressed more frequently in hostile than non-hostile terms.

The second alternate measure of gender role congruity is the growth rate of women's

⁹ Research assistants for Butler et al. hand-labeled ten thousand tweets from legislators as being negative, neutral, or positive in sentiment. They calculate tone by multiplying a legislator's negative tweets by negative one, neutral tweets by zero, and positive tweets by one, then summing the result.

representation in the state legislature.¹⁰ The proportion of women in office influences whether observers perceive women politicians as interlopers or insiders (Puwar 2004). In legislatures with low proportions and limited growth rates of women officeholders, women politicians may stand out as more visible deviations from the male norm. Alternatively, a sudden increase in women's representation may prompt a backlash, as suggested by research on violence against women in politics (Herrick et al. 2022; Sanín 2022).

Once again, women who more strongly violate gender role expectations experience backlash in the form of gendered content rather than overall volume. In states where the proportion of women is declining, women legislators receive approximately twice as much gender-based vitriol as men legislators. At the same time, the data reveals a more hopeful trend. As women's representation increases, gender remains a salient attribute - but it becomes less frequently associated with hostility and more frequently linked to non-hostile messaging. This pattern persists even in states where the proportion of women representatives remains below the national median. The model in Figure 3 suggests that as the proportion of women officeholders increases, their presence becomes normalized, triggering less backlash for gender role violations.

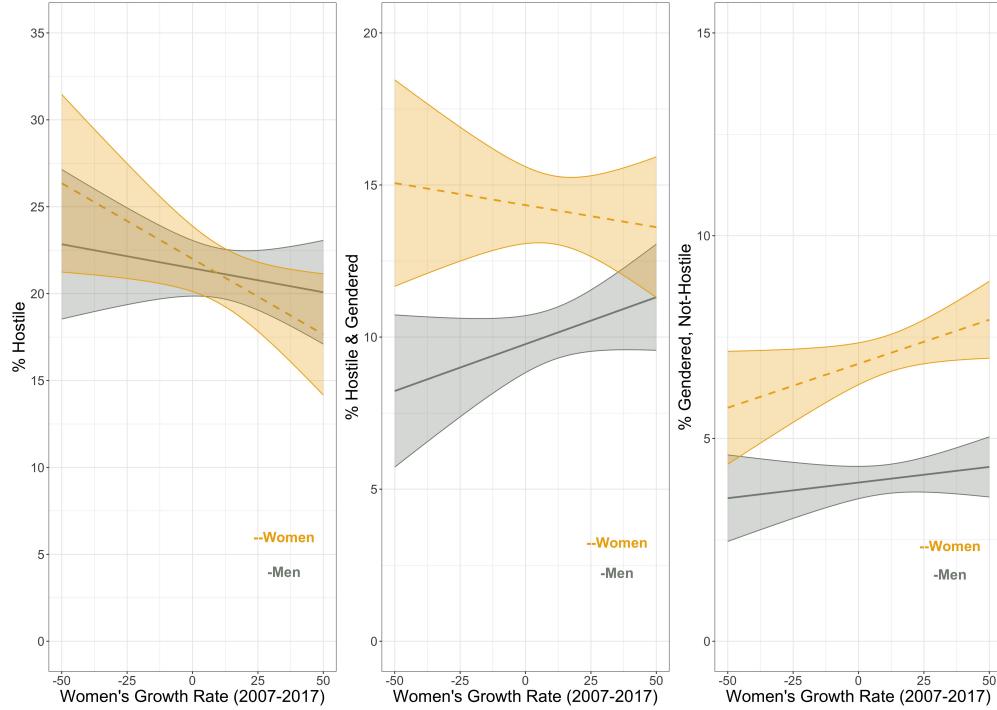
The results support my argument that the divergent results between self-reports and observational data stem from a mismatch in what each method captures. Incorporating gendered language into observational analyses yields findings that align with women's self-reported experiences (Bjarnegård et al. 2022; Erikson et al. 2023; Kosiara-Pedersen 2023). Backlash to women politicians who behave in gender role-incongruent ways often takes the form of distinctly gendered content. Patterns across visibility and other congruity measures reinforce the framing of public visibility as gender roles incongruent for women (Rheault et al. 2019). Across the three measures of gender role congruity, general hostility does not vary systematically by legislator gender.¹¹ In contrast, gendered hostility is closely tied to behavior and disproportionately directed at women. As women's behavior becomes more incongruous with traditional gender norms, they face significantly steeper increases in gendered hostility than men exhibiting similar behaviors.

These findings support the expectation that women who defy gendered norms are more likely to be targeted with gender-specific abuse (**H2**) and affirm that online environments diverge more starkly for men and women in the volume of gendered hostility than general

¹⁰ I calculate the growth rate of each state legislature as the difference in the number of women between 2017 and 2007 divided by the number of women in 2007. To capture cultural shifts, I use a growth rate rather than a static proportion of women officeholders.

¹¹ While the overall volume of abuse directed at men and women may be comparable, its impact on women's political engagement may be more severe given their continued global underrepresentation in formal office, political influence, leadership positions, and decision-making roles (Bochel and Bochel 2008; National Press Foundation 2024; ?).

Figure 3: Increasing Women's Presence Decreases Gendered Hostility



Note: The x-axis for each graph shows the growth rate of women in the state legislature. From left to right, the y-axes represent the percentage of (1) mentions that were hostile, (2) hostile mentions that were gendered, and (3) mentions that were gendered but not hostile. I obtained the predicted values from Table A.3 in the Supplementary Information.

hostility (**H3**). While gendered language does appear in non-hostile contexts, it is nearly three times more likely to occur alongside hostility, and non-hostile gendered language shows little systematic relationship to legislator behavior. These patterns underscore the need for computational text analysis research to move beyond volume-based measures and account for both gender roles and gendered content to capture the full scope of online political violence against women.

Part 2: Is Online Hostility Pushing Women Out of Office?

Thus far in the paper I have shown that women politicians *do* receive disproportionate abuse on social media platforms. Although men and women experience similar levels of general hostility, women experience nearly twice as much gender-based hostility. Scholars theorize that the inclusion of gendered content in hostility toward women politicians indicates a motive of punishing women's gender role violations and reducing their political

participation (Chadha et al. 2020; Frankel 2020; Holm et al. 2024; Kjøller and Pedersen 2025; Krook and Restrepo 2019; Krook 2020; Pedersen et al. 2024; Ramachandran et al. 2024; Womens Media Center 2017; Yan and Bernhard 2024). This finding that women receive more gendered hostility leads to the next unanswered question in the literature: Are women politicians disproportionately ending their political careers in response to online hostility? After testing competing expectations from the literature, I find that women's political ambition is resilient to gendered hostility.

The Gendered Impact of Online Hostility?

The literatures on gendered violence, violence against women in politics, and online hostility would lead us to believe that women politicians do exit politics in response to online abuse. Research within these fields consistently shows that abuse disproportionately impacts women politicians' behaviors. Surveys and interviews find that women are more likely than men to reduce their public presence following online attacks (Chadha et al. 2020; Holm et al. 2024; Håkansson and Lajevardi 2024; Pedersen et al. 2024). Even those who are not currently targeted often self-censor, either because of past experiences or after witnessing attacks toward a peer (Holm et al. 2024; Jankowicz 2017; Ramachandran et al. 2024; Sobieraj 2020). Among state legislators, targeted women report greater reluctance to use social media, make traditional media appearances, give interviews, and hold public events (Ramachandran et al. 2024). Most compellingly, larger shares of women than men report considering exiting politics after experiencing online attacks (Erikson et al. 2023; Herrick and Franklin 2019; Håkansson and Lajevardi 2024; Ramachandran et al. 2024).

The broader literature on women's experiences in office suggest an opposite expectation of women being resilient to gendered costs. Compared to men, women politicians report greater difficulty fundraising (Barber et al. 2016; Jenkins 2007; Thomsen and Swers 2017), receive less valuable committee seats than men (McGrath et al. 2025), and are more likely to be targeted by challengers (Lazarus and Steigerwalt 2018). At the same time, women raise just as much money as men (Hayes and Lawless 2016), are more effective at passing legislation (Eatough and Preece 2025), and demonstrate comparable rates of reelection as men (Butcher 2021, 2022, 2023; Butcher and Haynes 2024; Thomsen and Swers 2017). In addition, women are more responsive to constituents (Bauer and Cargile 2023; Butler et al. 2022; Dickson 2025; Thomsen and Sanders 2020) and cultivate more comprehensive legislative agendas (Butler et al. 2022; Lazarus and Steigerwalt 2018; Schmitt and Brant 2019). Collectively, the research indicates that although women experience different hurdles than men politicians, they find ways to overcome them and continue serving in elective office.

The theory of gender-based selection explains the duality of women's simultaneous greater challenges and performances. If women either perceive or experience sex discrimination in the electoral process, then only the most exceptionally capable and ambitious women will emerge as candidates (Anzia and Berry 2011a). As a result, the pattern of "when women run, women win" masks a reality where women must often exceed their male counterparts in demonstrable quality to be perceived as equally competitive (Bauer 2020b; Fulton 2012a; Lazarus and Steigerwalt 2018; Pearson and McGhee 2013).

Applied to the issue of gendered online hostility, gender-based selection theory suggests that the women who pursue political office will exhibit higher tolerance for abuse. Women who pursue political careers correctly anticipate gendered abuse and discrimination (Fox and Lawless 2024; Kjøller and Pedersen 2025; Shames 2017), meaning these costs were baked into their decision to enter politics. Their presence in office suggests they decided prior to campaigning that the gendered costs of online hostility would be worth bearing (Black 1972).

Indeed, women politicians have developed preventative strategies to mitigate or manage online abuse. There are three courses of action encouraged by candidate training groups. The first strategy is focused on prevention, where women strengthen their digital security using a suite of tools that prevent hacks and doxxing (Jankowicz 2022; SheShouldRun 2022). The second strategy is offloading social media accounts to staff (Schriock and Reynolds 2021; SheShouldRun 2022; Tenove et al. 2023). Finally, women are proactive in building communities with other women who can empathize, help report offensive comments to platforms, and advise on legal action (Jankowicz 2022; Schriock and Reynolds 2021; Sobieraj 2020).

Women demonstrate additional coping mechanisms beyond these formal actions. Some women normalize the abuse and report being unbothered by the attacks, even as they describe their tactics for avoiding future hostility (Astor 2018; Sobieraj 2020). Others fight fire with fire by "outing" their attackers or using insulting language as a means of self-defense (Boukemia, Sältzer, and Boyer Boukemia et al.; Phillips 2017; Sobieraj 2020). Many women reduce attackers' ability to discredit them by extensively citing official sources in their online communication (Jankowicz 2022; Schriock and Reynolds 2021; Sobieraj 2020). Even the decision to avoid speaking on volatile issues - while it has harmful implications for democracy - is evidence of adaptive strategies to manage abuse (Celuch et al. 2024; Sobieraj 2020).

Thus, we infer two competing theories within the literature for how women will respond to gendered hostility. The online hostility and violence against women in politics literature argues that the high costs of online abuse will reduce the utility of serving in office and thus spur women's disproportionate exit. This is the dominant expectation in the discipline, with over a dozen publications voicing it (Carson et al. 2024; CCDH 2024; Erikson et al. 2023; Harmer and Southern 2023; Herrick and Franklin 2019; Herrick and Thomas 2022; Håkansson

2024; Håkansson and Lajevardi 2024; Jankowicz 2017, 2022; Kosiara-Pedersen 2023; Krook 2017, 2020; Ramachandran et al. 2024; Sobieraj 2018, 2020; Thomas et al. 2019; Wagner 2022). The gender-based selection literature has not directly engaged with the question of how women politicians will respond to online hostility, however, it suggests the opposite. Because women in the candidate pool are aware of the gendered hostility women politicians experience, those who choose to pursue office will be exceptionally resilient to this abuse - perhaps more so than men - and develop adaptive strategies to overcome it.

H4a: Exposure to hostility will disproportionately increase women's likelihood of choosing to exit politics relative to men.

H4b: Women will demonstrate approximate or greater likelihood of campaigning despite exposure to hostility, relative to men.

Identifying Gendered Hostility

In determining the influence of exposure on ambition, I again choose to use state legislators as my case study for two reasons. First, state legislators have fewer resources to screen abuse, which increases the likelihood of violence making direct contact with the targeted politicians (Butler et al. 2023; Wood 2021).¹² Second, most national politicians begin their career in state legislatures (Holman 2017; Manning 2024; McCrain and O'Connell 2023). State legislators have already demonstrated political ambition by entering office, yet many are still early in their careers. As a result, state legislators are an ideal test case for examining how online hostility influences a politician's decision to exit.

I scraped all the public tweets ¹³ toward 1,247 state representatives that were available on Twitter in February 2023 and originated after June 2015. The Twitter handles for the representatives were collected by Butler et al. (2023).¹⁴ At the time the handles were identified, women and Democratic representatives were more likely to have a Twitter account than men or Republican representatives. The resulting corpus has approximately 14 million

¹² National politicians often hire staff whose job is to curate a daily “social media scrap” of relevant activity for their employer. As a result, well-resourced politicians are able to avoid direct engagement with abusive content online.

¹³ Mentions are public tweets which tag the legislator by including their handle.

¹⁴ Note: The original intention was to scrape Twitter mentions for the 3,399 state representatives identified by Butler et al. (2023) who were active on Twitter in 2017. As this process occurred, Twitter discontinued its academic API, cutting off the data collection at 1300 state representatives. Because the politicians were ordered alphabetically by first name, the dataset only contains politicians whose first names begin with the letter 'a' through 'i'. Balance tests (available in Appendix B) between the scraped and un-scraped politicians do not reveal proportional differences across gender, party, or race.

tweets directed at 370 women and 913 men politicians over four election cycles.¹⁵ Approximately half of the politicians are Republican, although women are nearly twice as likely to be members of the Democratic party. Most of the politicians (79%) are white.

I repeat the process described earlier of using hand-coding, zero-shot classification, and fine-tuning a pre-trained BERT model to label the text content of each tweet. This process, label instructions, and comparison between label scores is available in full in the Supplementary Materials. In addition to identifying hostile and gendered content, I additionally label for supportive text. A mention is "supportive" if it explicitly supports the legislator, encourages others to support the legislator, or praises the legislator. Table 2 shows a randomly chosen tweet from each combination of labels. These confirm that the LLM accurately detects hostile, gendered, and supportive content.¹⁶ I applied design-based supervised learning to correct errors in the BERT predictions to match the hand-coded labels (Egami et al. 2024).

Table 2: Labels show high face validity

Example Tweet	Hostile	Gendered	Supportive
"@legislator Really have to be the stupidest person on Twitter don't you?"	1	0	0
"@legislator You are in way over your head little girl!!"	1	1	0
"congressman @legislator gives his take on HB112"	0	1	0
"Women like @legislator are authentically themselves in representing the American people"	0	1	1
"@legislator Thank you for all that you're doing!!"	0	0	1

Identifying Movement Within or Out of Office

I collected the career paths of 1247 state representatives campaign decisions and outcomes from 2017 through 2023 using CAWP and Ballotpedia. At the end of each politician's term, I document whether they choose to campaign for reelection, a different office, or not at all. If they choose to campaign, I track which campaigns the politician entered, the state of the primary and general race, and the election result. I also account for whether the politician

¹⁵ Most state legislatures have two-year terms.

¹⁶ The F1 scores between the BERT predictions and the hand-coded tweets are 0.88 for gendered, 0.78 for hostile, and 0.83 for supportive.

received an appointed position or was term-limited out of their office. If a politician reaches the end of their term and does not campaign nor assume an appointed position, she is considered to exit. I continue to collect campaign decisions for politicians who have exited to account for political rebirths. The resulting dataset has 4,864 observations of politician-election year pairs. The demographic data of each politician—including race, party, gender, and district—were collected by Butler, Kousser, and Oklobdzija (2023).

Candidates must file paperwork by a specific deadline to appear on the ballot in their state. Deadlines vary by state and year. I collected filing deadlines from Ballotpedia and National Conference of State Legislatures. Politicians may determine which races to enter long before the filing deadline, however, the filing deadline represents a hard cut-off for the decision to campaign or exit. By adding the filing deadlines to the career path dataset, I can approximate a decision timeline for each politician – election year pair. I use the filing deadlines to form summary measures of a politician’s online environment in the six months leading up to the decision cut-off.¹⁷

As all the individuals held a state representative office in 2017, I filtered the dataset to begin in 2018. For legislatures with a two-year term, the data thus encompasses three election cycles. For individuals who exit and do not campaign again, only the first cycle they sat out is labeled as an exit. Subsequent inactive years are not considered in the model. Similarly, politician - election year pairs where the individual is term-limited out of office are not included in the dataset.

Table 3 shows the breakdown of politician campaign choices by gender across all politician-election year pairs. While the most common choice is to campaign for reelection to the same office, more than 20% of the decisions are to exit. Movements toward a different office are comparatively infrequent.

Table 3: Politicians prefer to campaign for reelection

	Reelection	Exit	Different Office
<i>Women</i>	756 (68.2%)	207 (20.8%)	108 (10.91%)
<i>Men</i>	1581 (67.9%)	562 (24.2%)	184 (7.9%)

Analysis

The literature yields competing theories on whether women politicians will respond to online hostility by exiting office. To test these alternate explanations, I use a multinomial

¹⁷ In the appendix, I discuss the decision to use six months prior to a filing deadline. I compare it to two alternate timeframes of two years and political lifetime.

logit to estimate the correlation between online hostility and the decision to exit politics. I approximate politician quality using five indicators: legislator effectiveness¹⁸, tenure in office¹⁹, lagged fundraising and donors²⁰, and visibility²¹. Standard errors are bootstrapped and clustered at the individual level.

The baseline category in the multinomial logit is the decision to not campaign. Model 1 shows the likelihood of an individual campaigning for a different office than they currently hold versus exit. Model 2 indicates the likelihood of campaigning for reelection versus exit. Thus, a positive coefficient indicates that the predictor is associated with a higher likelihood of being in the outcome category (e.g., campaign for reelection) rather than exit politics. A negative coefficient suggests that increasing the value of the predictor lowers the likelihood of a politician being in the outcome category rather than exiting.

Contrary to the widely published theory that online hostility is pushing women out of office, the results in Table 4 indicate that women are significantly *less* likely than men to exit office in response to gendered and general hostility. Instead, women respond to increased exposure by campaigning for a different office than they currently hold. As discussed earlier, this is strong support for the theory of gender-based selection, where women enter office expecting gendered discrimination (Fox and Lawless 2024; Kjøller and Pedersen 2025; Shames 2017) and develop adaptive strategies to manage and mitigate this abuse (Boukemia, Sältzer, and Boyer Boukemia et al.; Jankowicz 2022; Phillips 2017; Ramachandran et al. 2024; Schriock and Reynolds 2021; SheShouldRun 2022; Sobieraj 2020).

Robustness Checks

I strengthen the finding that women are less likely than men to exit with a series of robustness checks. First, I test whether the result in Table 4 holds when modeled as a binomial with a binary dependent variable of exit or campaign rather than a multinomial regression. The resulting table confirms the primary effect in Table 4 and is displayed in the Supplementary Materials.

¹⁸ The State Legislative Effectiveness Score captures the number of bills a legislator sponsored, the extent to which those bills advanced through the legislative process, and their substantive importance (Buchianeri et al. 2025). I use the 2017 SLES score because all the legislators in the dataset held office during this year.

¹⁹ I collected the first-year an individual was elected to any office using Ballotpedia, Wikipedia, personal websites, and newspaper articles.

²⁰ I incorporate fundraising information from Follow The Money <https://www.followthemoney.org/our-data/about-our-data>. This lagged variable provides the number of unique donors and the total sum raised by a candidate in their previous campaign. Where possible, I supplement fundraising data with DIME (Bonica 2024).

²¹ I use the number of mentions a politician received on Twitter as a measure of their name recognition and visibility to the public (Cha et al. 2010; Gorrell et al. 2020; Jarman Jarman; Rheault et al. 2019; Theocharis et al. 2020; Ward and McLoughlin 2020).

Table 4: Multinomial Logit with Cluster-Robust SEs (Bootstrapped)

	Campaign for a Different Office	Campaign for Reelection
Constant	-1.760*** (0.290)	-0.980*** (0.100)
Log Mentions	0.170 (0.200)	0.050 (0.060)
Fundraising (Scaled)	-0.040 (0.050)	0.030 (0.230)
Democrat	-0.220*** (0.040)	0.040 (0.180)
Legislative Effectiveness	0.050 (0.130)	0.100 (0.640)
Non-white	0.320*** (0.060)	0.270 (0.450)
Count Donors (Scaled)	0.460** (0.210)	0.440* (0.260)
Year First Elected (Scaled)	0.440*** (0.140)	0.250 (0.190)
In Office	0.880*** (0.100)	2.830** (1.180)
Woman	0.070 (0.250)	-0.220 (1.300)
General Hostility	-0.670*** (0.070)	-1.160 (1.010)
Gendered Hostility	-0.600*** (0.180)	-1.010 (1.000)
General Hostility \times Woman	1.310*** (0.130)	2.160 (3.600)
Gendered Hostility \times Woman	2.590*** (0.100)	-0.440 (3.480)
<i>N</i>	2619	
<i>LogLik</i>	-1650.49	
<i>AIC</i>	3357.00	
<i>BIC</i>	3521.40	
<i>McFadden R</i> ²	0.12	
<i>Cox-Snell R</i> ²	0.15	
<i>Nagelkerke R</i> ²	0.20	

Note: Cluster-robust (bootstrapped) standard errors shown in parentheses. Baseline category (Exit) omitted. *p<0.1; **p<0.05; ***p<0.01.

Second, I examine the effect of women moving toward a different office. An individual's place in the pipeline strongly correlates with how visible they are to the public, which in turn influences how much online hostility they receive (Bjørgo 2022; Håkansson 2021; Jarman Jarman; Rheault et al. 2019; Theocharis et al. 2020). This suggests that a politician who wished to reduce their exposure to online abuse could move to a lower profile office. There is some support for this theory in the literature. In a survey of politicians, women indicated twice as much willingness as men to decrease their pay in exchange for reduced harassment (Kjøller and Pedersen 2025).

Additionally, there is reason to expect that some women respond to gendered hostility with increased ambition. Sexually-based violence and gendered policy threats can be politically mobilizing for women because staying out of politics becomes perceived as too politically costly (Agerberg and Kreft 2023; Clayton et al. 2023; Dittmar 2020). Mobilization in response to marginalization is most pronounced among individuals with experiences of discrimination, suggesting that women politicians with higher exposure to gendered hostility will be more likely to campaign for more influential offices (Kjøller and Pedersen 2025; Pedersen et al. 2025).

I repeat the multinomial model, this time with separate categories for movement toward a higher or lower office. The results indicate that women are significantly more likely than men to campaign for both higher and lower offices rather than exit. I rank offices as higher or lower by considering whether the seat has more power within that same state's context. For instance, national positions and statewide executive seats are considered higher than a state legislative seat, whereas local or county level roles are considered lower. A full documentation of which offices appear in the dataset, at what frequency, and how they are coded, as well as the regression results, are available in the Supplementary Materials.

Third, I check whether men may be receiving hostility of a worse kind. To test this possibility, I use the open-source model Detoxify, which calculates the probability that a tweet includes the following: toxicity, severe toxicity, obscene, threat, insult, identity attack, sexually explicit language.²² ²³ ²⁴ I sum these scores to create a predicted abuse score for each tweet. Next, I compare mean abuse scores per tweet for men and women using a Welch two-sample t-test. Figure 4 is a dot-and-whisker plot illustrating the mean abuse score per

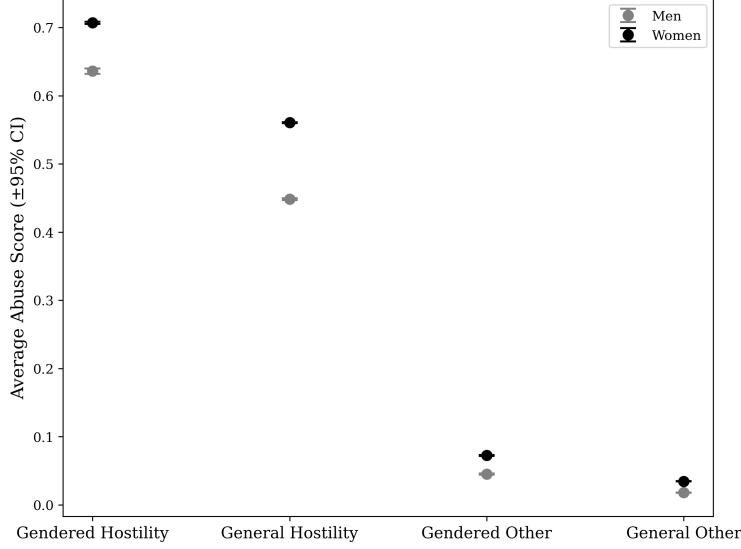
²² <https://github.com/unitaryai/detoxify?tab=readme-ov-file>

²³ The training data for this model was annotated in 2018 on the Figure Eight crowd rating platform, with each tweet being annotated by up to ten workers. The 'unbiased' model corrects for a tendency of text-classification models to assume all mentions of identities are intended negatively.

²⁴ Toxicity is defined as "a rude, disrespectful, or unreasonable comment that is somewhat likely to make you leave a discussion or give up on sharing your perspective". Severe toxicity follows the same schema, with the difference of *very* likely as opposed to *somewhat*. The category of identity attack specifically considers gender (male/female), sexuality, religion, race, and psychiatric or mental illness.

message by target gender across four categories of tweet labels: Gendered Hostility, General Hostility, Gendered Other,²⁵ and General Other.²⁶ The dots show the mean and the whiskers show 95% confidence intervals.

Figure 4: Hostility toward women is more abusive



Note: Women are consistently higher than men in both hostility types. General Hostility: 0.561 vs. 0.448 ($\Delta=0.112$; Welch t-test $p < 0.001$; Cohen's $d = 0.13$), Gendered Hostility: 0.707 vs. 0.636 ($\Delta=0.071$; $p < 0.001$; $d = 0.07$). Women are also slightly higher in the "Other" categories (Gendered Other: 0.072 vs. 0.045, $p < 0.001$; General Other: 0.034 vs. 0.018, $p < 0.001$).

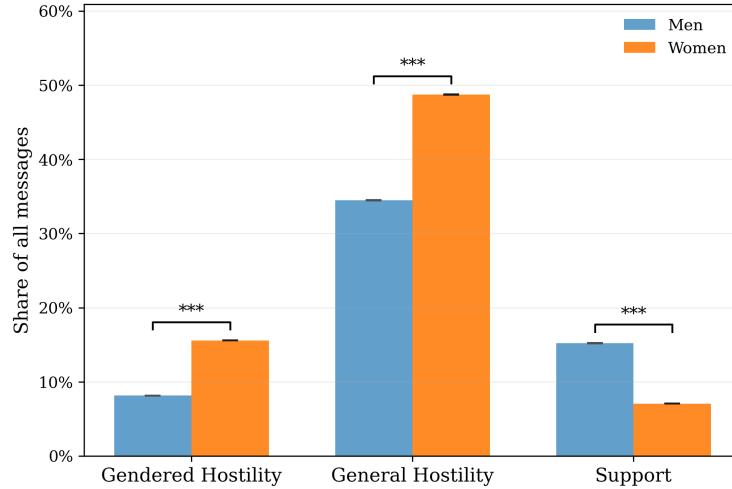
The results in Figure 4 show several important findings. Gendered hostility is more abusive than general hostility, particularly when it is directed toward women. Even when hostility is not gender-based, it is still more abusive when targeting a woman than a man. This finding adds weight to the result in Table 4. Despite receiving more severe abuse than men, women's ambition is more resilient.

Lastly, I check whether women receive greater proportions of supportive messages online, perhaps mitigating the effect of hostility on ambition. To test this, I computed the proportion of messages men and women received with gendered hostility, general hostility, and supportive content (both gendered and general). I ran a two-proportion z -test with pooled variance to compare the online environments of men and women. Figure 5 displays the results. On average, women receive nearly twice as much gendered hostility, one-and-a-half times the general hostility, and only one-third the support that men do. Paired with Table 4, these results further support applying the theory of gender-based selection by strengthening our understanding of women's exceptionalism.

²⁵ Tweets which were labeled as gendered and supportive, or gendered and non-hostile.

²⁶ Tweets which were labeled as non-gendered and supportive, or non-gendered and non-hostile.

Figure 5: Women receive more hostility and less support



Note: These results come from a two-proportion z -test with pooled variance. Differences are statistically significant at the $p < 0.001$ level.

Discussion

This article addresses two of the most pressing questions in modern politics - how politicians experience online hostility, and what consequences exposure to this hostility has on women in office. My research sheds new light on two important pieces of conventional wisdom in the literature. First, I demonstrate that the predominant narrative that women and men politicians experience similar online environments does not hold after accounting for the gendered content of abuse. Second, contrary to the extensive theorization that online hostility is leading women politicians to exit office, I use observational data to showcase that women's political ambition is resilient to gendered hostility.

This study makes two central contributions. First, it explains why some observational research has underestimated the prevalence of gendered hostility online. When computational text approaches to measuring online hostility fail to examine the gendered content of abuse, they risk missing the unique form of backlash directed at women who violate gender norms (Bardall et al. 2020). Incorporating gendered language into observational analyses yields findings that align with women's self-reported experiences (Bjarnegård et al. 2022; Erikson et al. 2023; Kosiara-Pedersen 2023). I show that visible women receive nearly twice as much gender-specific abuse as men despite experiencing similar overall volumes of hostility. Importantly, I show that backlash against role-incongruent women is not only more frequent but also more gendered in content.

Second, the study pairs observational data of politicians' online environments with their

career choices across four campaign cycles to demonstrate that online hostility is not pushing women out of office. Although women politicians receive more severe and gender-based online hostility than men, they are less likely than men to exit office in response to online abuse. This finding suggests a gender-based selection, where women in the candidate pool correctly anticipate gendered abuse and discrimination (Fox and Lawless 2024; Kjøller and Pedersen 2025; Shames 2017). As a result, the women who choose to pursue political careers are exceptionally resilient to this abuse and develop adaptive strategies to overcome it (Anzia and Berry 2011b).

Women's resilience to gender-based hostility does not negate the importance of countering the bias which inspired it. If policymakers were to take these findings seriously, we should observe more effort to understand the causal mechanisms behind differential responses to hostility within and across gender groups. Future research should consider the comparative weight of personality and structural supports, such as staff to handle social media accounts or harassment training, on whether politicians exit office.

Future research should additionally consider the broader impacts of online hostility on ambition and democratic representation. What, if any, ripple effects on policy and representation result from restricting political candidacies to only the individuals most willing to tolerate sustained abuse? Politicians believe that the intention behind gendered hostility is to silence women and push them out of the political domain (Frankel 2020; Jankowicz 2022; Phillips 2017; Sobieraj 2020). The demonstrated resilience of the women in this study suggests that the silencing effect of abuse may be most powerful in winnowing the candidate pool by making political office less attractive to all but the most thick-skinned individuals.

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Supplementary Material for: Toll of Trolls: Gendered Online Hostility and its Impact on Women Politicians Annie JarmanPhD Candidate, Washington University in St. Louis. Email: a.a.jarman@wustl.edu. Web: <https://anniejarman.github.io>.

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A Labeling Mentions

1 Instructions for *Hostile* Label

Hostility Classification: Label tweet 'hostile' or 'not hostile'. A tweet is 'hostile' if it does ANY of the following:

- Is strongly critical of @legislator
- Uses impolite, rude, or hurtful language
- Uses derogatory comments, swear words, vulgarities, threats, or hate speech
- Uses sarcasm or mocking tones, e.g., thanks a lot
- Has more than one question mark or an ellipsis '...'
- Uses dismissive or condescending language, including diminutives like 'Sweetie' or 'Honey', or suggests a statement by @legislator isn't important
- Includes sexual objectification or harassment
- Manifests racism, misogyny, homophobia, or attacks based on politics, religion, etc
- Uses ad hominem or personal attacks, such as accusing @legislator of having vices, being ineffective, corrupt, bigoted, etc
- Demands @legislator resign, belittles politicians, or advocates for electoral loss
- Cannot be confidently labeled as not hostile
- Includes hostile hashtags or emojis. Ignore URLs

2 Instructions for *Gendered* Label

Gendered Classification: Label tweet 'gendered' or 'not gendered'. A tweet is 'gendered' if it does ANY of the following:"

- Contains the specific words 'he', 'his', 'him', 'she', 'her', 'hers'. Pay special attention to these words
- Comments on @legislator's physical appearance, including wardrobe or pictures
- References @legislator's romantic or sexual relationships, marital or parental status, e.g., calling them a mother or father
- Makes judgments about competence based on @legislator's gender
- References stereotyped masculinity or femininity

- Mentions @legislator's gender explicitly, like stating they are a man, woman, congressman, or congresswoman
- Encourages the election of a specific gender
- Compares @legislator to an individual of the opposite gender
- Uses gendered slurs or slang like 'bitch', 'dick', 'asshole', 'dude', 'yes man', or 'girl boss'
- Cannot be confidently labeled as not gendered
- Includes gendered hashtags and emojis. Ignore URLs

3 Instructions for *Supportive* Label

”*Supportive Classification*: Label tweet 'supportive' or 'not supportive'.” A tweet is 'supportive' if it does ANY of the following:”

- Any 'thanks' (thanks/TY) in any context.
- Explicit support for the campaign (voting, donating, volunteering).
- Encouraging others to pray for @legislator or highlighting @legislator as a minority.
- Praise for legislative, public, or constituency work.
- Positive comparisons of @legislator to others.
- Compliments (bill passage, milestones, birthdays, sympathy).
- Friendly relationships or concern for @legislator's well-being.
- Positive interactions ('glad to be with')
- Vague niceties ('super', 'nice'), third-party updates, or cooperative actions without praise are not supportive.
- Hashtags/emojis can indicate support. Ignore URLs.

4 Partitioning Training Data

To build the training data, I randomly sampled tweets from each legislator to create a training corpus of 152,522 mentions, equal to 1% of the entire corpus. I partitioned the scoring subset into four groups, described in Table 1 ([Park and Montgomery 2025](#)). The first three sets were all labeled using gpt-4-turbo zero-shot classification on the OpenAI API, described below. Groups B and D were hand-labeled by expert coders to validate the zero-shot classification labels and final measure, respectively. Groups A and B are the training data, whereas Groups C and D are held out from BERT finetuning to validate the final measure.

Table 5: Partitioning training corpus for classification and validation

	Group A (n=122,615)	Group B (n=2,991)	Group C (n=23,925)	Group D (n=2,991)
Zero-shot classified label	✓	✓	✓	
Expert label		✓		✓
Held out from model training			✓	✓

5 Feature Representation and Model Validation

Table 6: Zero-shot predictions (before DSL) vs. group B

Metric	Gender	Hostile	Supportive
<i>Accuracy</i>	0.9364	0.8929	0.9237
<i>Recall</i>	0.6256	0.8272	0.8610
<i>Precision</i>	0.7651	0.7558	0.7931
<i>F1 score</i>	0.6883	0.7899	0.8256
<i>ROC_AUC</i>	0.8007	0.8706	0.9007

Table 7: BERT predictions (before DSL) vs. groups B & D

Metric	Gender	Hostile	Supportive
<i>Accuracy</i>	0.9718	0.8861	0.9265
<i>Recall</i>	0.9113	0.8295	0.8850
<i>Precision</i>	0.8486	0.7362	0.7900
<i>F1 score</i>	0.8789	0.7801	0.8348
<i>ROC_AUC</i>	0.9454	0.8669	0.9113

B Robustness Checks

1 Binomial Logit

Table 8: Logit: Exit vs. Not Exit with Cluster-Robust SEs

	Logit (Exit vs. Not Exit)
(Intercept)	0.520*** (0.170)
Log Mentions	-0.070** (0.030)
Fundraising (Scaled)	0.000 (0.050)
Democrat	0.010 (0.130)
Legislative Effectiveness	-0.090 (0.070)
Nonwhite	-0.280 (0.170)
Donors (Scaled)	-0.440*** (0.090)
Year First Elected (Scaled)	-0.270*** (0.060)
In Office	-2.400*** (0.150)
Woman	0.180 (0.180)
General Hostile	1.100*** (0.420)
Gendered Hostile	0.950 (0.780)
General Hostile × Woman	-1.910** (0.910)
Gendered Hostile × Woman	-0.940 (2.620)
<i>N</i>	2619
<i>Clusters</i>	1065
<i>LogLik (full)</i>	-936.336
<i>LogLik (null)</i>	-1276.356
<i>AIC</i>	1900.67
<i>BIC</i>	1982.86
<i>McFadden R</i> ²	0.2664
<i>AUC (ROC)</i>	0.7462
<i>Pct. Correct @ 0.5</i>	86.8%

Note: Standard errors clustered by individual legislator. Inactive cases coded as missing and dropped.

*p<0.1; **p<0.05; ***p<0.01.

2 Distinguishing between higher and lower offices

Table 9: Offices by Gender and Power Assessment

Office	Men	Women	Total	Likely to be More Powerful?
Governor	5	4	9	Yes
Lieutenant Governor	7	4	11	No (most states ceremonial)
State Senator	99	51	150	Yes
U.S. Senator	3	2	5	Yes
U.S. Representative	21	16	37	Yes
Secretary of State	5	4	9	Yes
Attorney General	4	1	5	Yes
State Auditor / Comptroller (incl. Missouri State Auditor, Auditor, Comptroller)	3	3	6	Yes
State Treasurer	1	2	3	Yes
Commissioner of Insurance	1	0	1	Yes
Superintendent of Public Instruction	1	0	1	Yes
State Supreme Court Justice (incl. "State Supreme Court")	1	1	2	Yes
Public Service Commission (incl. Montana exception)	2	2	4	No (except MT)*
Court of Appeals (state)	1	0	1	No
Trial Court Judge (civil, superior, county circuit)	2	4	6	No
Mayor	1	1	2	No (except big cities)
County Commission	4	1	5	No
City Council / Alderman	3	1	4	No
County Legislature	1	0	1	No
County Sheriff	1	0	1	No
District Attorney (U.S. Attorney if federal)	1	0	1	Yes
Local School / Education Board (incl. school boards, community college boards)	1	1	2	No
Local Financial / Administrative Officers (incl. county auditors, municipal treasurers, property appraisers)	0	3	3	No
Federal Agency State Director (incl. USDA, Farm Service Agency roles)	0	3	3	Yes
U.S. Ambassador	1	0	1	Yes
Deputy or Assistant to Elected Official (incl. Deputy Secretaries, Borough Presidents, Chiefs of Staff, Policy Directors, Budget Commissioners, Parole Board, Supervisor of Huntington)	11	3	14	No

3 Multinomial Logit, comparing higher vs. lower offices

Table 10: Multinomial Logit with Cluster-Robust SEs (Bootstrapped)

	Model 1 (With Hostility)			Model 2 (Without Hostility)		
	Coef.	SE	OR	Coef.	SE	OR
Likelihood of Campaign for Lower Office vs. Exit						
Intercept	-3.65***	(0.84)	0.03	-3.80***	(0.70)	0.02
Log Mentions (6 Months)	0.10	(0.31)	1.11	0.14	(0.32)	1.15
Fundraising (Scaled)	-0.15	(0.20)	0.86	-0.17	(0.23)	0.84
Democrat	0.34***	(0.10)	1.40	0.29***	(0.07)	1.34
SLES17	-0.24***	(0.05)	0.78	-0.24***	(0.04)	0.78
Nonwhite	1.45***	(0.04)	4.28	1.40***	(0.03)	4.06
Donors (Scaled)	0.45	(0.53)	1.57	0.48*	(0.28)	1.61
Year First Elected (Scaled)	0.54***	(0.13)	1.72	0.55***	(0.11)	1.73
In Office	0.65***	(0.06)	1.92	0.53***	(0.06)	1.70
Woman	-1.07***	(0.21)	0.34	-0.07	(0.48)	0.93
General Hostility	-1.26**	(0.61)	0.28	—	—	—
Gendered Hostility	1.31***	(0.14)	3.71	—	—	—
General Hostility × Woman	4.44***	(0.32)	84.54	—	—	—
Gendered Hostility × Woman	4.19***	(0.10)	66.09	—	—	—
Likelihood of Campaign for Higher Office vs. Exit						
Intercept	-1.96***	(0.07)	0.14	-2.04***	(0.22)	0.13
Log Mentions (6 Months)	0.18	(0.52)	1.20	0.16	(0.14)	1.17
Fundraising (Scaled)	-0.03	(0.27)	0.97	-0.04	(0.28)	0.97
Democrat	-0.30*	(0.18)	0.74	-0.27***	(0.10)	0.76
SLES17	0.07	(0.21)	1.07	0.08	(0.07)	1.08
Nonwhite	0.04	(0.13)	1.04	0.04	(0.43)	1.04
Donors (Scaled)	0.47***	(0.10)	1.59	0.49*	(0.28)	1.63
Year First Elected (Scaled)	0.42	(0.39)	1.52	0.42***	(0.16)	1.52
In Office	0.91***	(0.10)	2.49	0.91***	(0.15)	2.48
Woman	0.25	(0.66)	1.29	0.43***	(0.11)	1.54
General Hostility	-0.54***	(0.06)	0.58	—	—	—
Gendered Hostility	-1.24***	(0.25)	0.29	—	—	—
General Hostility × Woman	0.74***	(0.18)	2.09	—	—	—
Gendered Hostility × Woman	2.52*	(1.34)	12.41	—	—	—
Likelihood of Campaign for Reelection vs. Exit						
Intercept	-0.98	(0.69)	0.37	-1.13***	(0.09)	0.32
Log Mentions (6 Months)	0.05	(0.45)	1.05	0.02	(0.26)	1.02
Fundraising (Scaled)	0.03	(1.00)	1.03	0.03	(0.11)	1.03
Democrat	0.04	(0.27)	1.04	0.09	(0.06)	1.10
SLES17	0.10	(0.19)	1.10	0.10	(0.49)	1.11
Nonwhite	0.27	(2.20)	1.31	0.26	(0.24)	1.29
Donors (Scaled)	0.44	(1.45)	1.55	0.47***	(0.17)	1.59
Year First Elected (Scaled)	0.25	(1.05)	1.29	0.24	(0.34)	1.28
In Office	2.83	(2.92)	16.94	2.83***	(0.20)	17.01
Woman	-0.22	(0.99)	0.80	0.10	(0.14)	1.11
General Hostility	-1.16	(1.35)	0.32	—	—	—
Gendered Hostility	-1.02	(5.58)	0.36	—	—	—
General Hostility × Woman	2.16	(3.93)	8.68	—	—	—
Gendered Hostility × Woman	-0.41	(3.50)	0.66	—	—	—
<i>N</i>	2,925			2,925		
<i>Log-Likelihood</i>	-1732.83			-1741.70		
<i>AIC</i>	3549.70			3543.40		
<i>BIC</i>	3796.20			3719.50		
<i>McFadden R</i> ²	0.12			0.12		
<i>Cox-Snell R</i> ²	0.16			0.16		
<i>Nagelkerke R</i> ²	0.21			0.20		

Note: Bootstrapped (n=10,000) standard errors are clustered at the individual level. Odds ratios (OR) are exponentiated coefficients. Dashes (—) indicate terms not included in that model. The comparison group is those who exited politics. Significance: *p<0.1; **p<0.05; ***p<0.01.

4 Multinomial Logit, Odds Ratios instead of Coefficients

Table 11: Multinomial Logit with Cluster-Robust SEs (Bootstrapped)

	Different Office vs. Exit			Reelection vs. Exit		
	Coef.	SE	OR	Coef.	SE	OR
Constant	-1.760***	(0.290)	0.17	-0.980***	(0.100)	0.37
Log Mentions	0.170	(0.200)	1.18	0.050	(0.060)	1.05
Fundraising (Scaled)	-0.040	(0.050)	0.96	0.030	(0.230)	1.03
Democrat	-0.220***	(0.040)	0.80	0.040	(0.180)	1.04
Legislative Effectiveness	0.050	(0.130)	1.05	0.100	(0.640)	1.10
Non-white	0.320***	(0.060)	1.38	0.270	(0.450)	1.31
Count Donors (Scaled)	0.460**	(0.210)	1.59	0.440*	(0.260)	1.55
Year First Elected (Scaled)	0.440***	(0.140)	1.55	0.250	(0.190)	1.29
In Office	0.880***	(0.100)	2.41	2.830**	(1.180)	16.96
Woman	0.070	(0.250)	1.07	-0.220	(1.300)	0.80
General Hostility	-0.670***	(0.070)	0.51	-1.160	(1.010)	0.31
Gendered Hostility	-0.600***	(0.180)	0.55	-1.010	(1.000)	0.36
General Hostility × Woman	1.310***	(0.130)	3.71	2.160	(3.600)	8.63
Gendered Hostility × Woman	2.590***	(0.100)	13.37	-0.440	(3.480)	0.64
<i>N</i>			2619			
<i>LogLik</i>			-1650.49			
<i>AIC</i>			3357.00			
<i>BIC</i>			3521.40			
<i>McFadden R</i> ²			0.12			
<i>Cox-Snell R</i> ²			0.15			
<i>Nagelkerke R</i> ²			0.20			

Note: Bootstrapped cluster-robust standard errors in parentheses. Odds ratios (OR) are exponentiated coefficients.

The comparison group is *Exit*. * $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.

The odds ratios reported in Table ?? provide a more intuitive interpretation of the logit coefficients presented in the main text. Odds ratios above one indicate an increase in the likelihood of the outcome relative to exit, while odds ratios below one indicate a decrease. Among key predictors, general hostility and gendered hostility both reduce the odds of a man campaigning for a different office by about half. These results suggest that both forms of hostility act as deterrents to men's continued candidacy. However, the interaction terms show that women respond differently: the odds of women running for a different office increase by nearly four times under general hostility and by more than thirteen times under gendered hostility. This pattern indicates that women adapt to hostile environments by shifting offices rather than exiting politics altogether. Other predictors operate as expected. Higher fundraising, more donors, and earlier years of first election all increase the likelihood of continued candidacy, while nonwhite legislators are about 1.4 times more likely to campaign for a different office than white legislators. In contrast, being a Democrat decreases

the odds of pursuing a different office. Taken together, these odds ratios complement the coefficient estimates by showing not only the direction and significance of effects but also their substantive magnitude in shaping political career trajectories.