

# Visible Representation: How Spotighting Women in Government Can Inflate Perceptions of Gender Equity\*

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## Abstract

Women’s presence in the bureaucracy has risen in recent decades, a trend often trumpeted by presidents, but women remain underrepresented. How does elite rhetoric emphasizing women’s presence in government affect perceptions that government will be responsive to women? Using original panel data on federal employee gender between 1973-2020, and drawing on elite interviews, we propose a theory of *visible representation*: political communications spotlighting a group’s presence in government, even a small number, signals that government has prioritized the group’s welfare—even in the absence of any gains in representation. In pre-registered and replicated experiments, we show presenting statistics on federal agencies’ gender compositions in terms of women’s job shares (e.g. 20% of an agency’s jobs are “held by women”) rather than logically equivalent information emphasizing men (e.g. 80% “held by men”) increases beliefs that government represents women’s interests. Elites can impart the impression of descriptive representation even in its relative absence.

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# 1 Introduction

On August 26, 1984, the 64th anniversary of women’s suffrage, Ronald Reagan appeared on the South Lawn of the White House encircled by hundreds of women employees from across the federal government to celebrate Women’s Equality Day. After reciting statistics on the share of women occupying jobs in various employment sectors, Reagan remarked, “You know, I can’t help thinking that women like you, women who have accepted the burdens of government service and work so successfully to give our country a new birth of freedom and vitality, show clearly just how much American women can accomplish.” To underscore the strides made by women on his watch, he then singled out U.S. Ambassador to the United Nations Jeane Kirkpatrick, and Sandra Day O’Connor, whom Reagan had appointed a few years earlier as the first woman on the U.S. Supreme Court.

It was a spectacle so striking that it is doubtful anyone in observance spent a moment pondering the fact that the share of women occupying top-tier jobs in federal agencies that year was less than 10%.

Women have made substantial gains in the executive branch since that day, but their overall level of representation remains relatively low throughout the federal bureaucracy: about 23% among top-tier federal agency posts in 2020, and around 39% among rank and file agency employees the same year. In addition, progress toward gender diversity has been uneven: as we show below, women tend to gain jobs in the bureaucracy under Democratic presidents, only to lose them under Republicans. Despite (or perhaps because) of this uneven progress and underrepresentation, politicians in both political parties often trumpet the nominations of women to highly-visible top posts as evidence government is committed to diversity and prioritizes women’s welfare. Are such appeals effective, and can they potentially mislead voters into thinking government is doing a better job representing

women’s interests than it actually is?

Building on a rich literature on framing effects in public opinion (Kahneman and Tversky, 1979; Druckman, 2001a; Gross and D’Ambrosio, 2004; Sniderman and Theriault, 2004; Boudreau and MacKenzie, 2013; Scheufele and Iyengar, 2012; Boydston and Glazier, 2013; Klar et al., 2013; Coe et al., 2017; Feezell, Glazier and Boydston, 2021), we present and test a theory of how rhetorical emphasis on the presence of women in government can distort public perceptions of descriptive representation and government efficacy. In short, this theory holds that just as politicians have discretion over which aspects to emphasize when discussing policy (Hopkins and Mummolo, 2017; Coppock and Green, 2022) or current events (Diamond, 2020), presidents also have choice over which members of their administrations to spotlight in public remarks, creating a window for framing effects to occur. In other words, presidents have a substantial ability to make some government employees *visible*, and in doing so, can convey subtle but powerful signals to the public that they prioritize the needs of groups with which those employees identify. In the case of women, our theory predicts elite discussions which emphasize the presence of women in powerful positions cause the mass public to perceive government is looking out for women’s best interests, even in the absence of any representational gains.

To be clear, our claim is not simply that voters place more trust in government to advocate for women when more women obtain government jobs—a core finding in prior research on the effects of descriptive representation on perceived government efficacy (Tate, 2001; Gay, 2008). Rather, our theory holds that communications which merely *emphasize* the presence of women in government can boost such perceptions, even relative to communications which also convey women’s presence but place less emphasis on them, and even absent any actual gains by women in the bureaucracy. While such communications may

sometimes signal sincere priorities, the ease with which we theorize they can be effectively transmitted to voters opens the door to cheap talk. In this way, politicians can impart the perception of descriptive representation even as women remain severely underrepresented in the halls of power.

To establish and evaluate this theory, we draw on an original panel data set of gender representation at various levels of federal agencies spanning the period 1973-2020, original interviews with executive branch appointees, and a series of survey experiments. We first show women are increasingly represented among top-tier federal posts,<sup>1</sup> moving from 2% to 23% between 1973 and 2020. However, these gains have not been monotonic: they tend to emerge under Democratic presidents, only to be partially undone under Republican administrations, resulting in an overall upward trajectory but low levels overall. As we discuss below, this dynamic is consistent with the differing views we observed in interviews with former and current federal appointees—Democratic officials were more prone to endorse the view that gender diversity was vital for government performance. We further show women’s share of rank and file federal jobs has been much more stagnant, climbing to 39% by 2020 but still well below the share of women in the U.S. workforce. In sum, women have made gains, but remain severely underrepresented relative to men in the executive branch.

Having established these descriptive facts, which we use to form hypotheses about heterogeneous messaging effects, we turn to experimental tests of our theory of *visible representation*. We first test whether individuals prefer women to lead federal agencies on average by presenting a hypothetical press release announcing a presidential Cabinet nominee which randomly varies the nominee’s pronouns to signal gender identity, but holds

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<sup>1</sup>Top-tier posts as defined throughout include Senate-confirmed Executive Schedule and salary-equivalent positions paid at levels I through V in Cabinet agencies. These positions are listed in the United States Government Policy and Supporting and Supporting Positions (Plum Book) every four years following a presidential election.

their name, job qualifications and remarks constant. We find that signaling the nominee is a woman boosts perceptions of both the nominee’s competence and of agency performance. Consistent with our pre-registered hypotheses, these effects are pronounced among women and Democrats. These results are also in line with prior research on “issue publics” showing information which is highly relevant to individuals is more likely to be salient when encountered (Krosnick, 1990; Iyengar et al., 2008; Stroud, 2011), and with recent polling indicating women and Democrats value gender diversity more than their male and Republican counterparts (Vandermaas-Peeler et al., 2018; Najle and Jones, 2019; Poushter and Fetterolf, 2019; Edsall, 2022).

While these results are consistent with our theory, a direct test requires a delicate manipulation that varies rhetorical emphasis on women in government without also implicitly conveying any change in the prevalence of women (i.e. holding concrete gains for women constant). To achieve this, we randomly assign participants to read brief mission statements of various federal agencies, and then convey the gender composition of each agency’s employees by either emphasizing the percent of jobs belonging to women or men, while holding the substantive content of this information fixed (e.g. either stating an agency is comprised of 40% women or 60% men; logically equivalent information).<sup>2</sup> We find consistent evidence this subtle change in emphasis increases perceptions that an agency will better represent women and that it will fulfill its mission in general. With one exception, effects on both outcomes—2-5 percentage points, on average—hold regardless of the agency being described. In fact, these effects are so strong that informing people 20% of an agency’s jobs are held by women causes them to be nearly as optimistic about an agency’s ability to represent American women as informing people that 50% of jobs are held by men.

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<sup>2</sup>We note gender identity need not conform to a binary classification of “men” and “women.” We provide an extended discussion of this point as it relates to our analysis in Section B.3.

In other words, information implying a *smaller* share of women in government is received nearly as positively as information implying a much larger share so long as the language emphasizes women. We also find these effects are stronger among women participants, but, contrary to expectations, find little evidence that effects vary by political party affiliation.

Taken together, we conclude elite rhetoric centering the presence of women in government can inflate the public's view of the quality of descriptive representation, especially among women. While such communications may be genuine, the fact that such substantial changes in perceptions are generated by such subtle and arbitrary changes in phrasing opens a concerning avenue for a cynical communications strategy in which elites dampen pressure for additional gender diversity by placing outsized emphasis on the relatively small share of women already occupying government positions (Georgeac and Rattan, 2019).

In what follows, we introduce and analyze an original panel data set on the gender composition of various tiers of federal agencies since the 1970s and, in concert with original interviews with federal appointees, establish several stylized facts that provide important context for our study and inform key planks of our theory. Next, we outline our theory of *visible representation*, and elaborate on the experimental designs we use to test this theory. We then report results, and conclude with a discussion of the implications of our findings for the dynamics of descriptive representation, and potential extensions of our framework for scholarship on race- and class-based diversity in government.

## **2 Women in the Executive Branch Over Time**

A comprehensive examination of the effects of political rhetoric on perceptions of women's representation requires historical context on the strides made by women thus far, as well as an understanding of the dynamics and viewpoints inside the bureaucracy that have helped

and hindered these advances. In this section, we draw on original panel data on the gender composition of the executive branch and elite interviews with federal appointees from both major parties to establish several descriptive patterns: (i) major progress for women in the bureaucracy has occurred relatively recently and proceeded at different rates across levels of agencies; (ii) women have had higher representation under Democratic administrations than Republican ones, on average, a fact that informs a key hypothesis relating to partisanship in our theory of *visible representation*, which we outline in Section 3.

## 2.1 Data on Gender Diversity in the Executive Branch

Our panel data set of employee gender in federal agencies comprises two levels: overall gender composition among rank and file employees in cabinet-level agencies, and the gender composition of Senate-confirmed positions in the same years (1973-2020).<sup>3</sup> The rank and file statistics come from a combination of numerous requests for non-public data we made to the Office of Personnel Management, which provided us with data for 1973-2014, and publicly downloadable data at the OPM FedScope website covering 2015-2020.

Because data on the gender of Senate-confirmed “top-tier” employees over time was not readily available, we manually coded this information using the 1968-2020 “Plum Books,” (formally, the United States Government Policy and Supporting Positions), to build our data set (Light, 1995).<sup>4</sup> These books are published every four years and include all presidentially-appointed positions within the federal government. Presidentialy-appointed positions requiring Senate confirmation represent the leadership ranks of each agency as

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<sup>3</sup>The agencies in our data include: Agriculture, Commerce, Department of Defense (including separate gender statistics for Air Force, Army, Navy), Education, Energy, Housing and Urban Development, Homeland Security, Health and Human Services, Interior, Justice, Labor, State, Transportation, Treasury, Environmental Protection Agency, and Veterans Affairs.

<sup>4</sup>Note: whether a particular agency job is Senate-confirmed varies in some cases over time. To minimize the degree to which the composition of our sample changes over time, we include positions in this top-tier category if they were Senate-confirmed at any given point during the years we study.

well as leaders of the internal offices, bureaus, divisions, and services within them. In order to obtain the names of people serving in these roles in the intervening years between four-year intervals, we also used the United States Government Manuals, which are official handbooks of the Federal Government published each year in a special edition of the Federal Register. The handbooks include the names of officials heading major operating units in the executive branch of U.S. government.<sup>5</sup> We hired research assistants to assist with the compilation of these data and code the gender of government officials based on their first names. While computational techniques have been devised to classify gender (Hu, 2021; Wais, 2016), the prestigious nature of Senate-confirmed presidential appointments allowed us to use standard Google searches for the names of public officials in our data in cases where the correct gender of officials was ambiguous, using pronouns in bios, press releases, news stories, and transcripts from Senate hearings. To verify the accuracy of this large manual coding effort, we randomly sampled 100 rows of our dataset and confirmed via web searches that the pronouns and honorifics used in public documents matched the gender codings in our data. This exercise produced an accuracy estimate of 99%. See Appendix A.2 for details.

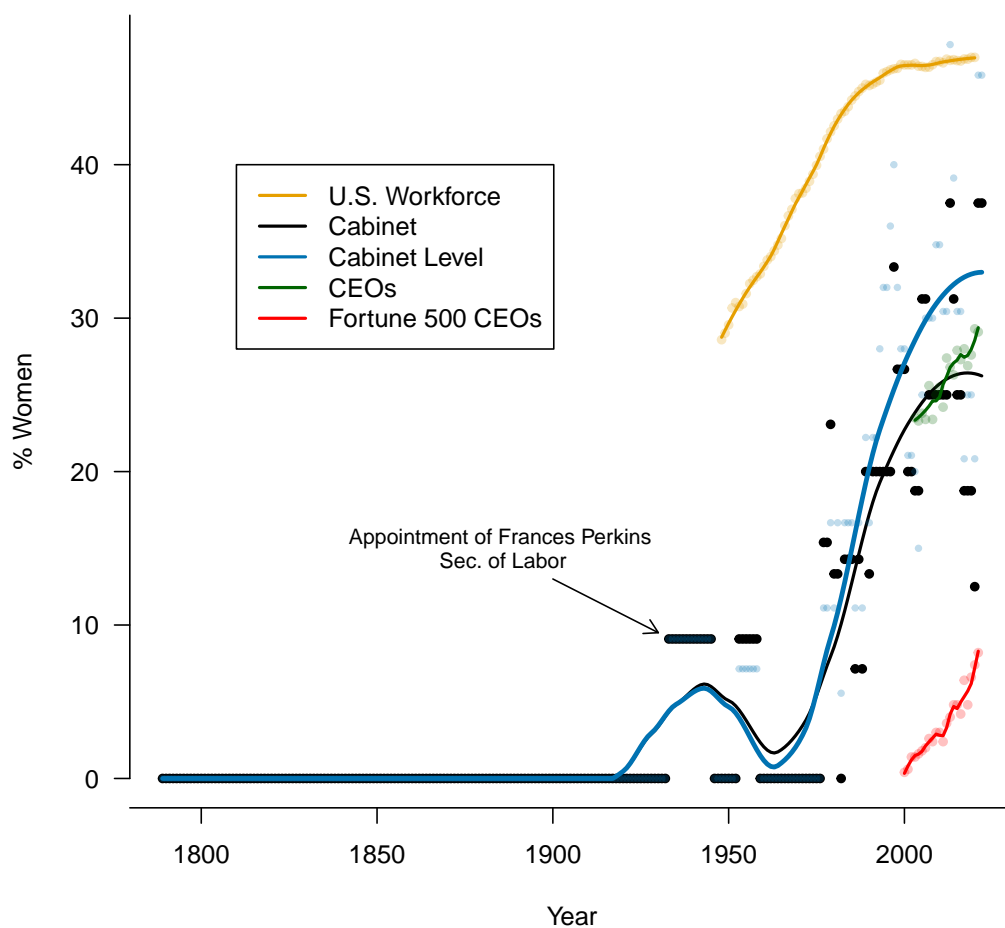
And as Figure 1 shows, not a single woman assumed a Cabinet position until the appointment of Frances Perkins as Sec. of Labor in 1933, 13 years after the ratification of the 19th Amendment granting women the right to vote (UVA, 2021). However, this macro view of women's representation masks important partisan dynamics that emerge from our more detailed panel data.

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<sup>5</sup>U.S. Government manuals for years 1935-2021 can be accessed on the GPO's website here: <https://www.govinfo.gov/app/collection/govman>.



Figure 1: **Women in the President’s Cabinet Since 1789.** The plot displays the percent of Cabinet positions held by women since the U.S. Constitution took effect. The black time series shows “Cabinet” positions, which includes the vice president and the heads of 15 agencies, and the blue time series shows “Cabinet-level” positions, which includes the Cabinet and additional positions presidents can elevate to Cabinet status at their discretion, such as the chair of the Council of Economic Advisors. The percent women in the total U.S. workforce, among U.S. CEOs, and among Fortune 500 CEOs are plotted for reference. Both Cabinet time series remain constant at 0% until the appointment of Frances Perkins as Secretary of Labor in 1933.



## 2.2 Partisan Dynamics in Women’s Representation

Figure 2 shows the recency of growth in women’s representation in the executive branch covaries with the party in power. The bottom time series in the plot shows the percent of top-tier posts in federal agencies held by women over time (pooling employees across all agencies), i.e. posts requiring U.S. Senate confirmation.<sup>6</sup> While the share of top positions filled by women has increased markedly from about 2% in the Nixon administration to 23% in the Trump administration, reaching a peak in Obama’s second term of approximately 35%, the series also shows relative decreases in women’s representation at the top levels during Republican administrations.<sup>7</sup>

The long, stunted and uneven process of growth in women’s representation at the top rungs of power is consistent with the wide range of opinions we observed in interviews among former and current federal appointees and career civil servants from both parties on the importance of gender diversity in government. While most of these 10 interview subjects—all women, whose postings spanned multiple agencies from the Reagan administration to present day, including inside the White House—agreed there is a public relations premium to having visible women in government, the view that gender diversity was vital to government performance was primarily limited to Democratic appointees.

People serving during Republican administrations like Anita McBride, who was responsible for White House staffing under Reagan and for recruiting senior leaders at the State Department under George W. Bush, expressed concern over some of the ways gender diversity might be achieved. “But it’s not quotas. That is a word you will hear talking

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<sup>6</sup>Note: vacant positions excluded from denominator in these calculations. In addition, both top-tier and rank and file panel data sets rely on data from the same agencies every year. However, the number of positions included in a given year varies. Analyses using only job titles appearing consistently in each agency throughout this time period produce highly similar conclusions. See Figures A1.

<sup>7</sup>Over this period, the share of women in top-tier roles is roughly 9.8 percentage points lower among Republican administrations than among Democratic administrations, on average ( $p < .01$ ).

to people on the other side of the aisle, they may argue quotas are necessary,” McBride said. “My experience is that—quotas can call into question the viability and suitability of a candidate” (McBride, 2020). Annie Pforzheimer, a career foreign service officer, Deputy Chief of Mission in Afghanistan and Acting Deputy Assistant Secretary of State in Kabul under Trump, stressed that “beyond the visual. . . sometimes gender is a highly irrelevant distinction. . . in most policy areas to me it is not a factor at all,” (Pforzheimer, 2020). Similarly, an official working in the State Department under George W. Bush, who declined to be identified, doubted whether changes in women’s representation in the State Department were meaningful, particularly when examining short time periods. “In Bush 43 when Colin Powell was Secretary of State there were a lot of women. Six undersecretaries, two were women. Then when Condi became NSA, there were four women and two men as undersecretaries. So does that mean that is better than before? I don’t know.”

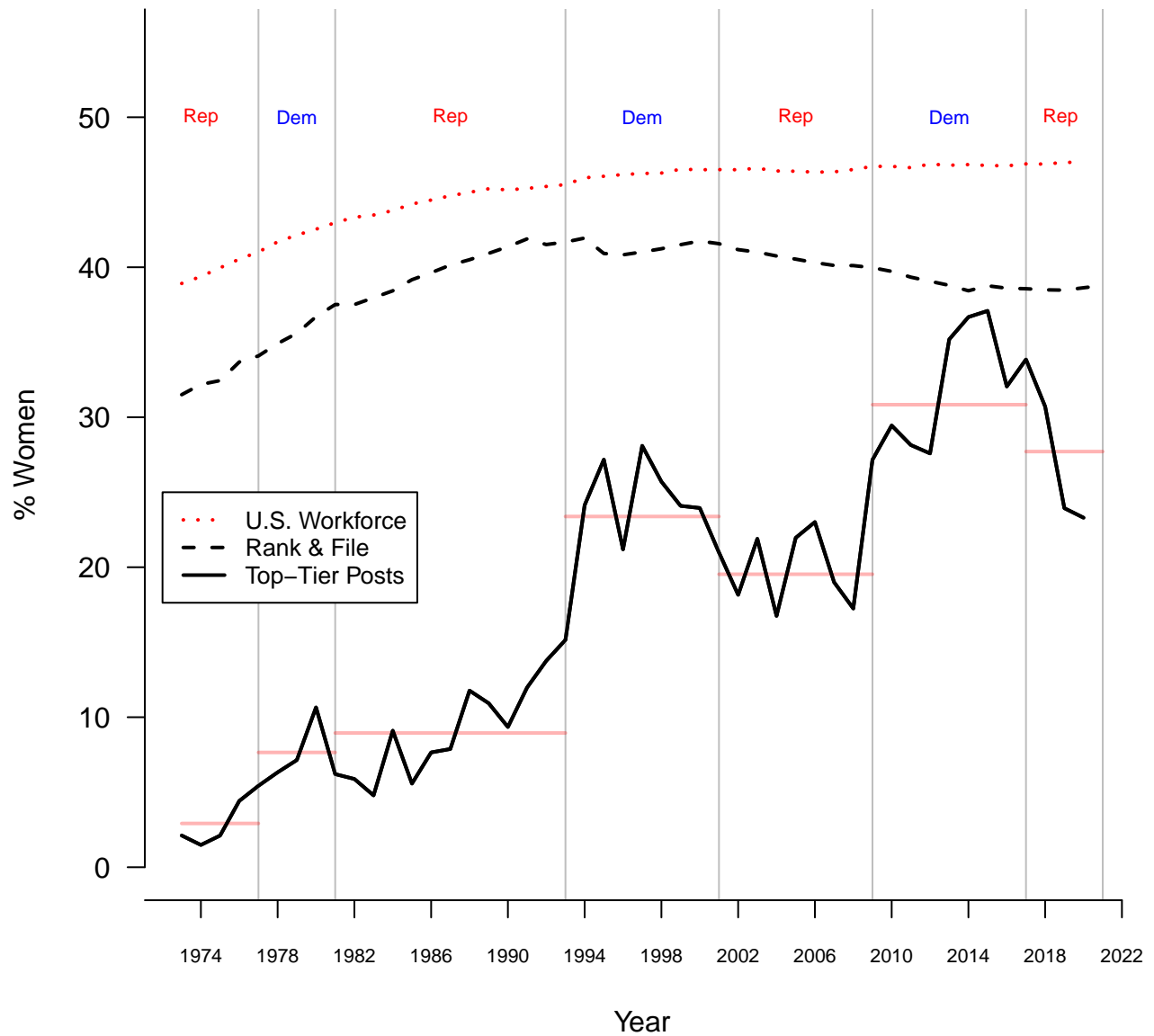
While some Democratic appointees expressed similar skepticism,<sup>8</sup> others, like Nealin Parker, who formerly served as Chief of Staff of HUD in the Obama administration, were unequivocal on the necessity of adequate representation for women in the bureaucracy. “[G]ender diversity is important for anyone trying to serve a people who are gender-diverse,” Parker said, “both from the standpoint of what issues leaders are likely to see, prioritize and solve, and also from the standpoint of whether the people feel they are represented and feel comfortable bringing their issues to the fore,” (Parker, 2020).

In addition to partisan trends, Figure 2 also underscores that the rate at which women have made gains varies markedly across levels of the bureaucracy. While the share of women serving in top-tier positions increased precipitously from the 1970s to 2020, the share of women serving in rank and file positions has remained relatively flat, increasing

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<sup>8</sup>Amy Holman, currently Deputy Chief of Mission in Senegal in the Department of State under Biden, questioned the importance of gender diversity for government performance. “I don’t really think it’s that important for achieving the mission,” (Holman, 2020).

Figure 2: **Gender Representation in Federal Agencies Over Time.** The figure displays the percent of jobs in federal agencies held by women over time, separately for “top-tier” (Senate-confirmed) and rank and file positions. The percent of women holding jobs in the total U.S. workforce over the same period is displayed for reference. Horizontal red lines denote means of top-tier posts during each presidential administration. The party occupying the White House during each period is also noted.



from about 32% in 1973 to about 40% by the 1980s and remaining there from 1990 to 2020. Put differently, while the number of women appointed to highly-visible and prestigious Senate-confirmed posts has increased, the share of women serving in the lower ranks of the bureaucracy has changed only modestly in close to fifty years. In fact, as the figure shows, the share of women in rank and file positions within the bureaucracy was roughly 8-percentage points lower than women’s employment in the U.S. overall in 2020. To be sure, it is more difficult for presidents to make substantial changes to the composition of rank and file posts because they tend to be occupied by career employees protected by civil service laws. But the time span of this stagnation casts doubt on the suspicions of some of our interview subjects that there is too much emphasis on gender diversity in government—it is “overanalyzed” as one former State Department official under George W. Bush said—as well as widespread beliefs that government is sufficiently gender diverse.

The lack of growth for women in the lower ranks can have important downstream effects. Specifically, this stagnation may stymie the ascendance of women into more prominent roles, since these lower-level positions represent a talent pool where future leaders can be cultivated. McBride explained the importance of establishing a “pipeline” for women who could rise through the ranks of executive branch agencies and one day become leaders. Leaders are not “plucked out of nowhere,” McBride explained. “Where you really are building the team for the future is at the lower levels. On the political appointments side, you have a lot of flexibility and ability to do that” (McBride, 2020).

### **3 A Theory of *Visible Representation***

The notion that diversity in government is critical to the formation of an effective civil service has been a persistent theme in political science since Donald Kingsley’s 1944 study

of British government challenging Max Weber’s conception of bureaucracies as impersonal organizations staffed with “cogs” (Kingsley, 1944). The very ability of the democratic State to triumph over its totalitarian rivals, argued Kingsley, depends on its ability to resist excluding “any considerable body of its citizens from full participation in its affairs. It requires at every point that superior insight and wisdom which is the peculiar product of the pooling of diverse streams of experience,” (Kingsley, 1944, 185).

While empirical evidence for the impact of women bureaucrats on policy outputs remains mixed (Maier, 1975; Dolan, 2001; Ba et al., 2021; Potter and Volden, 2021), presidential administrations have relied on executive branch appointments to signal their commitment to women’s issues and representative government. Perhaps the most visible example of this exercise is the appointment of women to head Cabinet agencies. Presidents are praised when their Cabinets “look like America,” as President Clinton famously touted, and chastised when they do not (Locin, 1995). President Obama became defensive at the start of his second term in light of charges that he had appointed no more women to Executive Branch leadership posts than President Clinton had almost two decades earlier. “Until you’ve seen what my overall team looks like, it’s premature to assume that somehow we’re going backwards,” said Obama. “We’re not going backwards, we’re going forward,” (Lowrie, 2013). Continually faced with questions about President Trump’s alleged sexism and misconduct, Trump administration officials and allies were quick to point to the number of women who worked as top advisors in the Trump White House and as Cabinet secretaries, which has at times surpassed his predecessors (Kessler, 2018; CAWP, 2019; Ward, 2019). Even before Biden’s inauguration, the number of women and people of color on his Cabinet shortlist was closely scrutinized, with liberal groups expressing concern that the appointments looked “male-er” (Shear and Crowley, 2021) than they had hoped. Biden

himself asserted in a June 2020 op-ed that “Across the board—from our classrooms to our courtrooms to the president’s Cabinet—we have to make sure that our leadership and our institutions actually look like America,” (Biden, 2020).

How do such prominent discussions of women in government impact the public’s assessments of descriptive representation? Decades of research on framing effects on public opinion offer the foundation for one explanation. Though its meaning has evolved and been debated over the years (Chong and Druckman, 2007), a framing effect, at its core, is a matter of emphasis (Klar and Schmidt, 2017). That is, communications which present essentially the same information, but emphasize different facets of that information, can lead to divergent perceptions. In a foundational example, Kahneman and Tversky (1979) show that framing outcomes in terms of losses rather than gains (e.g. a ‘25% chance of losing a game’ vs. an ‘75% chance of winning a game’) leads to sharply different preferences despite the fact that the two statements are logically equivalent. This framework has been elaborated on extensively in the realm of political attitudes and public opinion. In another canonical example, Nelson, Clawson and Oxley (1997) shows that framing news of a public demonstration by a hate group in terms of free speech rather than public safety increases support for the group’s right to hold the event (Druckman, 2001*b*). Similar effects have been shown on attitudes toward the death penalty (Baumgartner, Linn and Boydston, 2019), welfare (Huber and Paris, 2013) and affirmative action (Kinder and Sanders, 1990).

While prior research has largely focused on framing effects in the contexts of policy discussions (Hopkins and Mummolo, 2017) or current events (Diamond, 2020), we theorize that the ways in which presidents discuss and spotlight members of their administrations also create the opportunity for framing effects to occur. Presidents have discretion over which members of their administrations to draw attention to when communicating to the

public, and in doing so, they can convey subtle but powerful signals that they prioritize the needs of groups with which those employees identify. In other words, presidents have a substantial ability to make some government employees *visible*, and in turn increase the perception that government is attentive to the needs of particular constituencies.

The targeted nature of these communications also suggests that they will not be uniformly effective across individuals. Rather, based on robust literatures on differential attention (Taylor and Thompson, 1982; Kathryn A. Braun and Levin, 1997) and “issue publics” showing individuals find personally relevant information highly salient upon encountering it (Krosnick, 1990; Iyengar et al., 2008)—including women when encountering news on issues like reproductive freedom and health (Bolson and Leeper, 2013; Mummolo, 2016)—we expect group members in the mass public to be most responsive to communications that emphasize administration officials belonging to the same group. In the case of women, not only is the presence of women in government relevant, it may also resonate more strongly to an audience of women because women are much more likely to believe gender discrimination to be a serious issue than are men (Vandermaas-Peeler et al., 2018). Our theory therefore predicts that communications which emphasize women’s presence in government will be particularly effective among women. In addition, surveys indicate that Democrats purport to care more about an inclusive and gender equal society than their Republican counterparts (Najle and Jones, 2019). These patterns are consistent with the partisan dynamics in gender composition demonstrated in Section 2.2, and with the divergence in views between executive branch officials of different political affiliations. We therefore also hypothesize that Democrats will be more affected by the changes in emphases we describe.<sup>9</sup>

In sum, our theory offers a new mechanism by which elite communications affect perceptions of descriptive representation in the mass public, potentially in cynical and misleading

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<sup>9</sup>See Appendix B.2 for pre-registration of these hypotheses.



ways. While an increased rhetorical emphasis on women in government may provide a genuine signal that an administration prioritizes women’s well-being, the ease with which such signals can be communicated according to our theory may also incentivize politicians to engage in cheap talk, appointing women to positions that while prominent, help mask the fact that women remain severely underrepresented.

## 4 Experimental Design

Before directly testing our theory of *visible representation*, we first deploy an experiment to assess the baseline question of whether women are preferred to men to lead federal agencies on average, especially among women and Democrats. If this baseline premium is not present, at least in key demographic groups, there is little reason to expect elites to go out of their way to emphasize women in government. To do this, we employ a vignette design in which a hypothetical press release is presented to survey respondents describing a presidential nominee to lead a federal agency (randomly assigned to be either Defense, Treasury, HHS or Education). All the details of the announcement are held constant, including the nominee’s name, “Alex Smith,” but respondents were randomly assigned to receive a version with either masculine or feminine pronouns/titles throughout (e.g. “[Ms./Mr.]”; “[mother/father] of two”; and “[she/he] said in a statement.”). All conditions also state that the nominee is “an expert in [security/economic/health/education] policy,” with the subject of expertise jointly assigned with the agency (e.g. expertise in “security” displayed to respondents viewing the Dept. of Defense condition). Importantly, this design improves upon prior work that signals gender based on varying first names ([Moss-Racusin et al., 2012](#)). With our design, names, which may unintentionally convey alternate traits like race or class, are held constant, providing a cleaner manipulation of the concept of interest. To

encourage exposure to treatment, this press release was displayed for 30 seconds before participants were allowed to advance in the survey.

Following the press release, respondents were asked two items which served as dependent variables: (i) “How much confidence do you have in Alex Smith’s ability to effectively lead the [Agency Name]” and (ii) “After reading about the announcement of Alex Smith, how much confidence do you have in the president’s ability to fill the government with qualified and responsive public servants?” Both items were measured on four-point scales. Our pre-registered hypotheses in this experiment were that participants would respond more positively on both items to the version of the press release describing a woman nominee, and that this effect would be pronounced among women and Democrats. The primary quantity of interest in this experiment is the average difference in responses between conditions using feminine pronouns relative to masculine pronouns.

While evaluating whether the public has a general preference for women bureaucrats is a vital first step to testing our theory, a more direct test is needed to isolate the effect of merely emphasizing women in government, absent the addition of any new women in government roles. To isolate this effect, we conduct an equivalence framing experiment in which respondents were randomly assigned to view brief mission statements copied from the web sites of four federal departments: Treasury, Defense, Education, or Health and Human Services. These agencies, presented to participants in random order, were chosen because previous scholarship has classified them as stereotypically “men’s” or “women’s” agencies ([Potter and Volden, 2021](#)). By including a range of federal agencies, we can also ensure that our results are not an artifact of an idiosyncratic design choice.

After reading a mission statement, respondents were randomly assigned with 1/8 probability to see no additional information (the pure control group), while all other respondents

were randomly assigned to view a version of the following statement: “In recent years, about [X%] of the [jobs/top jobs] in this agency have been held by [women/men],” where X was a “dose” randomly drawn from the set  $\{20,30,40,50,60,70,80\}$ . (See Appendix B.4 for examples of these various conditions.)<sup>10</sup> The gender and dose treatments were independently randomized across the four items. Following each of the four items, all respondents were asked (i) “How much confidence do you have that the U.S. [Agency Name] will represent the best interests of American women?” and (ii) “How much confidence do you have that the U.S. [Agency Name] will fulfill its mission?” These items served as dependent variables in this experiment; responses were measured on four-point scales.

The primary quantity of interest in this experiment can be written as:

$$\alpha_x = E[Y | X = x\%; G = \text{“women”}] - E[Y | X = 100 - x\%; G = \text{“men”}] \quad (1)$$

where  $Y$  is a dependent variable,  $X$  is a randomly assigned percentage (treatment dose), and  $G$  is the corresponding randomly assigned gender of the federal employees being described (i.e.  $X$  and  $G$  are jointly assigned). Based on the theory of *visible representation*, we expect that  $\alpha_x$  will be positive, especially among women and Democrats relative to men and Republicans, respectively. That is, we expect participants to respond more positively when the percentage women,  $x$ , is stated than when the percentage men,  $(100-x)$ , is stated, despite the fact that these convey essentially equivalent information. We underscore that because equivalence framing designs convey logically equivalent information while merely varying which aspects of that information are highlighted, they represent

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<sup>10</sup>Note: we also randomized whether the information on gender composition pertained to “jobs” or “top jobs” in an agency. We had no pre-registered hypothesis about this between-respondent randomization, but included it to make our results applicable to a wider range of scenarios. This word change had no statistically significant effect on responses, both in isolation, and when interacted with the gender treatment. See Appendix B.5 for details.

among the most precise tests of counterfactuals, and are recognized as superior to so-called “emphasis framing” experiments which vary content, clouding interpretations (Scheufele and Iyengar, 2012).<sup>11</sup>

## 4.1 Experimental Sample

Our survey sample was collected by the vendor Qualtrics in January 2022 with a sampling strategy designed to hit national benchmarks for gender and race/ethnicity, and to include roughly 1/3 Democrats, 1/3 Republicans and 1/3 Independents (with partisan leaners counted as Independents for sampling purposes, but coded as partisans for all analyses below). As a result, our survey sample closely mirrors the U.S. population on standard variables. See Appendix B.1 for details on sample demographics, sampling procedures, and information participant compensation and ethical considerations.

## 5 Results

Table B9 displays the results of the nominee experiment testing whether men or women Cabinet nominees are preferred. The first three columns of the table display the effects of providing feminine pronouns in the press release relative to male pronouns on how much confidence respondents had that the nominee would be effective in this position. Model (a) shows that the average treatment effect of this manipulation in the pooled sample is a 4 percentage-point increase ( $p < 0.05$ ). Model (b) interacts treatment with indicators of respondents’ party identification (Republicans are the omitted category). The results show that among Republicans, the pronoun treatment has a statistically insignificant 1.5

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<sup>11</sup>We also conducted a third experiment designed to see whether visualizations of gender composition in the executive branch over time affected perceptions of descriptive representation and government efficacy. We omit discussion of this experiment in the main text to focus on results most central to our theory. See Appendix B.7 for details on the design and results of this experiment.

percentage-point effect, but that among Democrats, the effect grows by 4.9 percentage points, a difference in effects that is statistically significant ( $p < 0.05$ ). Effects among Independents were not statistically distinguishable from effects among Republicans. Column (c) interacts treatment with an indicator for survey respondents identifying as women. The results show that among male respondents, feminine pronouns caused a statistically insignificant 1.7 percentage-point increase in confidence, while the effect among women respondents is 4.7 percentage points larger, a statistically significant difference in effects ( $p < 0.05$ ).<sup>12</sup>

Columns (d)-(f) model effects on confidence that, based on this press release, the president will staff the government with “qualified and responsive public servants,” and shows a highly similar pattern of results. In the pooled sample (column (d)), feminine pronouns cause a 2-point increase in confidence ( $p < 0.05$ ). Column (e) shows the effect among Republicans is near zero ( $p > 0.05$ ), but is 4.4 percentage points larger among Democrats, a statistically significant difference ( $p < 0.05$ ). The result is nearly identical when conditioning on respondent gender: the effect among men is near zero, but grows by 4.5 points among women, a statistically significant difference ( $p < 0.05$ ).

In sum, the results of this experiment correspond closely with our pre-registered hypotheses: women are preferred to men for high-level executive positions, especially by women and Democrats. But while these results show prima facie support for some aspects of our theory—namely, that there is a premium to emphasizing gender diversity, especially among women and Democrats—we turn to the equivalence framing experiment for a direct test of our central prediction: that mere changes in emphasis on either men or women employees will change perceptions of how effectively government represents women. To get

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<sup>12</sup>Note: Appendix Table B2 shows effects conditional on which agency respondents were assigned to read about, and finds no heterogeneity in effects.

Table 1: **Effects of Gender Treatment in Nominee Experiment.** The table below shows results of OLS regressions estimating the effect of using feminine pronouns relative to male in the nominee experiment. Models (a) - (c) estimate effects on confidence that the nominee will effectively lead the agency. Models (d) - (f) estimate effects on confidence the president will fill the government with competent employees. Models (a) and (d) show average effects in the entire sample. Models (b)-(c) and (e)-(f) condition on respondent party and gender, respectively. Dependent variables were measured on four-point scales but transformed to range between 0 and 1 to ease interpretation.

	Nominee Effective			President Effective		
	(a)	(b)	(c)	(d)	(e)	(f)
(Intercept)	0.603 (0.005)	0.564 (0.008)	0.603 (0.007)	0.586 (0.005)	0.515 (0.009)	0.590 (0.008)
condition: feminine pronouns	0.040 (0.007)	0.015 (0.012)	0.017 (0.011)	0.021 (0.008)	-0.003 (0.013)	-0.001 (0.012)
Independent		-0.023 (0.015)			0.003 (0.016)	
Democrat		0.101 (0.011)			0.168 (0.011)	
feminine pronouns x Independent		0.039 (0.021)			0.052 (0.022)	
feminine pronouns * Democrat		0.049 (0.015)			0.044 (0.016)	
woman respondent			0.000 (0.010)			-0.007 (0.011)
feminine pronouns * woman respondent			0.047 (0.014)			0.045 (0.016)
<i>N</i>	5171	5171	5171	5171	5171	5171

Robust standard errors in parentheses  
indicates significance at  $p < 0.05$

a sense of the results at a high level, Table 2 displays the results of this experiment pooled across levels of randomly assigned gender compositions (i.e. pooling over the randomly assigned values from the set  $f20\%,30\%,40\%,50\%,60\%,70\%,80\%g$ ), and pooled across the four agencies described to each respondent.<sup>13</sup> As in the previous set of results, the first column estimates the average treatment effect in the pooled sample, and finds that relative to conditions where statistics convey the percentage of government jobs held by men, those

<sup>13</sup>The coefficient on the gender treatment in this pooled regression is equivalent to taking a weighted average of the within-cell differences in responses (e.g. the difference in response between the 80%men/20%women bucket, 70%men/30%women bucket, etc.) across all doses. Note: Appendix Table B4 estimates these pooled effects separately by the order in which an item was viewed. Items viewed in the third and fourth positions produced smaller treatment effects than items viewed in the first position. Pooled results estimated on the first survey item only show a gender effect of 6 and 3 points on the women’s interest and agency mission outcomes, respectively ( $p < 0.05$  in both cases).

who saw information conveying logically equivalent statistics in terms of percent women registered 4.5 percentage points higher on a measure of confidence that the agency being described would represent women’s best interests. Model (b) tests for heterogeneity in this effect by the party ID of survey respondents, but finds none, contrary to expectations. However, as model (c) shows, the effect of the “women” condition on male survey respondents was 2.8 percentage points ( $p < 0.05$ ), while the effect among women was 3.2 percentage points higher, a statistically significant difference in effects ( $p < 0.05$ ).

Models (d)-(f) show a very similar pattern of effects on confidence that the agency would fulfill its mission. In the pooled sample, emphasizing women boosted confidence in agency fulfillment by 1.9 percentage points ( $p < 0.05$ ). Effects were highly similar across respondents of different partisan identities. Women again exhibited larger effects than men—the effect among male respondents was near zero, while the effect among women was 2.1 percentage points higher, a statistically significant difference in effects ( $p < 0.05$ ).

As these results show, merely emphasizing the share of federal jobs held by women rather than men boosted perceptions that government would attend to the interests of women, and be more efficacious in general, despite the fact that both conditions conveyed essentially equivalent information. While this effect was not pronounced among Democrats, it was significantly higher among women than among men. In addition, Appendix Table B3 displays results from models that condition on which agency is being described, pooled across doses. The results show that the pooled effects displayed above occur at similar levels across all agencies for models estimating confidence that women’s interests will be well represented. However, for models estimating confidence the agency will fulfill its mission, we find significantly larger effects of the gender treatment when the agency being described is Education, HHS or Treasury rather than the Dept. of Defense; the effect of the

Table 2: **Effects of Gender Treatment in Equivalence Framing Experiment.** The table below shows the results of OLS regressions estimating the effects of emphasizing women (relative to men) in the equivalence framing experiment, pooled across all doses. Models (a) - (c) estimate effects on perceptions that the agency will best represent women’s interests. Models (d) - (f) estimate effects on perceptions the agency will fulfill its mission. Models (a) and (d) show average effects in the entire sample. Models (b)-(c) and (e)-(f) condition on respondent party and gender, respectively. Dependent variables were measured on four-point scales but transformed to range between 0 and 1 to ease interpretation.

	Represent Women’s Interests			Fulfill Mission		
	(a)	(b)	(c)	(d)	(e)	(f)
(Intercept)	0.537 (0.004)	0.521 (0.006)	0.561 (0.006)	0.561 (0.004)	0.518 (0.006)	0.572 (0.006)
condition: control	0.004 (0.006)	-0.005 (0.010)	0.006 (0.009)	-0.012 (0.006)	-0.022 (0.010)	-0.009 (0.010)
condition: women	0.045 (0.004)	0.034 (0.007)	0.028 (0.006)	0.019 (0.004)	0.011 (0.007)	0.009 (0.006)
Independent		-0.044 (0.011)			-0.021 (0.011)	
Democrat		0.058 (0.009)			0.113 (0.008)	
control * Independent		-0.003 (0.018)			0.018 (0.018)	
women * Independent		0.020 (0.012)			0.015 (0.012)	
control * Democrat		0.021 (0.014)			0.013 (0.014)	
women * Democrat		0.017 (0.009)			0.013 (0.009)	
woman respondent			-0.048 (0.008)			-0.021 (0.008)
control * woman respondent			-0.006 (0.013)			-0.007 (0.013)
women * woman respondent			0.032 (0.008)			0.021 (0.008)
<i>N</i>	20684	20684	20684	20684	20684	20684

Standard errors clustered by respondent in parentheses  
indicates significance at  $p < 0.05$

gender manipulation is 2 points in the DOD condition, but increases by roughly 3-5 points in the other three conditions ( $p < 0.05$  for both the DOD effect and differences in effects relative to DOD). We speculate this heterogeneity may stem from stereotypes associated with women’s abilities in defense and foreign policy (Koch and Fulton, 2011).



While these pooled effects supply a succinct high-level summary, they mask important nuances in the results across doses of the treatment. Figure 3 shows the average responses to the item measuring confidence that an agency will be responsive to American women, separately for each gender condition and randomly assigned percentage (the mean response in the control condition, in which no information on gender composition was conveyed, and accompanying 95% confidence intervals is plotted in orange for reference). Within each level of the dose-response experiment, the gaps between the red and blue estimates show that respondents receiving logically equivalent information on the gender composition of government agencies reported starkly different perceptions of descriptive representation depending on which gender was emphasized. (These gaps correspond to the sample analogue of  $\alpha_x$  from Equation 1. See Appendix Figures B10-B11 And Tables B5-B8 for additional estimates of  $\alpha_x$ .)

Specifically, framing information in terms of percent men produces lower assessments than the control condition when percentages convey an extremely lopsided gender composition (80% men, or 70% men). However, for all other levels, framing information in terms of men essentially elicits responses in line with those in the control condition, where no information on gender is provided. Respondents who saw information expressed in terms of percent women reported statistically significantly higher levels of confidence (relative to an equivalent statement expressed in terms of percent men) that the agency would represent women's interests in all cases but the 60% men/40% women stratum. Once percentages rise to 50% or above, the women treatment causes responses to climb high above the pure control condition. Overall, this pattern shows that, relative to the control, these framing effects are mostly positive responses to the emphasis on women, rather than negative reaction to emphasis on men. In fact, mean responses to being told an agency is only

20 and 30% women are statistically indistinguishable from several responses to conditions conveying that men occupy 50% or jobs or less, conditions which imply much higher shares of women in government.

We see a similar but somewhat more muted pattern of results in Figure 4, which displays average responses to the item measuring confidence the agency will fulfill its mission. As the figure shows, emphasizing women again leads to higher assessments on average. Relative to conditions where equivalent information was provided in terms of percent men, statistically significant differences emerge once percentages exceed 50% women (the right half of the plot). These results show that emphasizing women not only increases confidence that government will be attentive to women's interests, but that it will be more competent in general.

We stress that experiment features an extremely subtle manipulation, far less extreme than the emphasis placed on women by recent presidents when discussing diversity in government, which often involve coordinated press events, photo ops and carefully crafted speeches. It is therefore possible that this rhetorical approach has even larger effects in practice than in this controlled environment. We also note that these results closely mirror the results obtained from a pilot study, displayed in Appendix B.6.

Figure 3: **Equivalence Frame Experiment: Perception Agency Will Represent Women’s Interests.** The figure displays mean responses in the equivalence framing experiment (shapes are point estimates; bars are 95% confidence intervals). Respondents were told about an agency’s mission and then given either no information on the agency’s gender composition (control), told the agency was “ $X\%$  men”, or told the agency was “ $(100-X)\%$  women”, where  $X$  is a randomly drawn value from  $f(20,30,40,50,60,70,80)g$ . As the figure shows, presenting information on gender composition in terms of “% women” rather than “% men” leads to higher confidence that the agency will best represent women’s interests, on average, despite the fact that the information is logically equivalent.

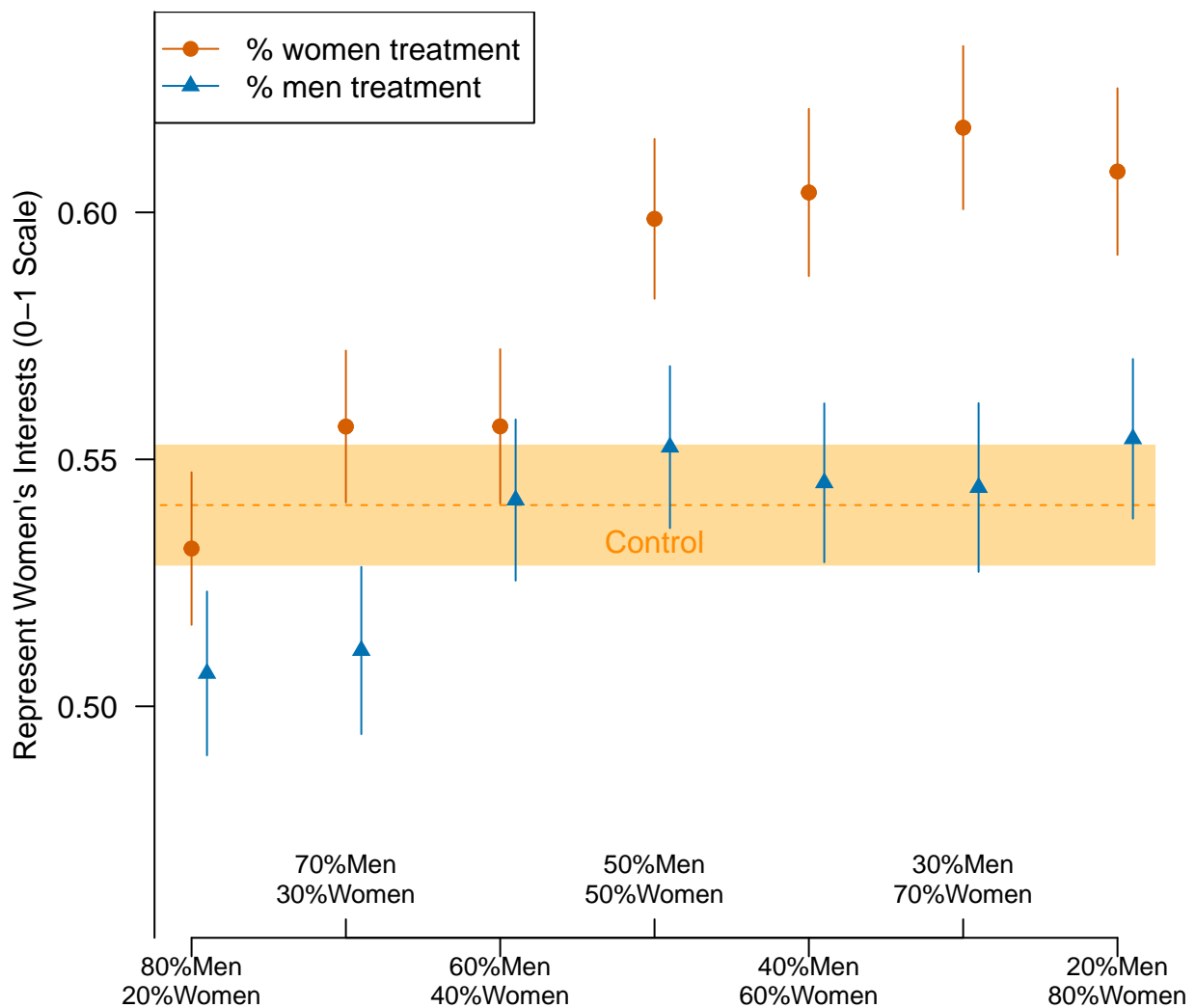
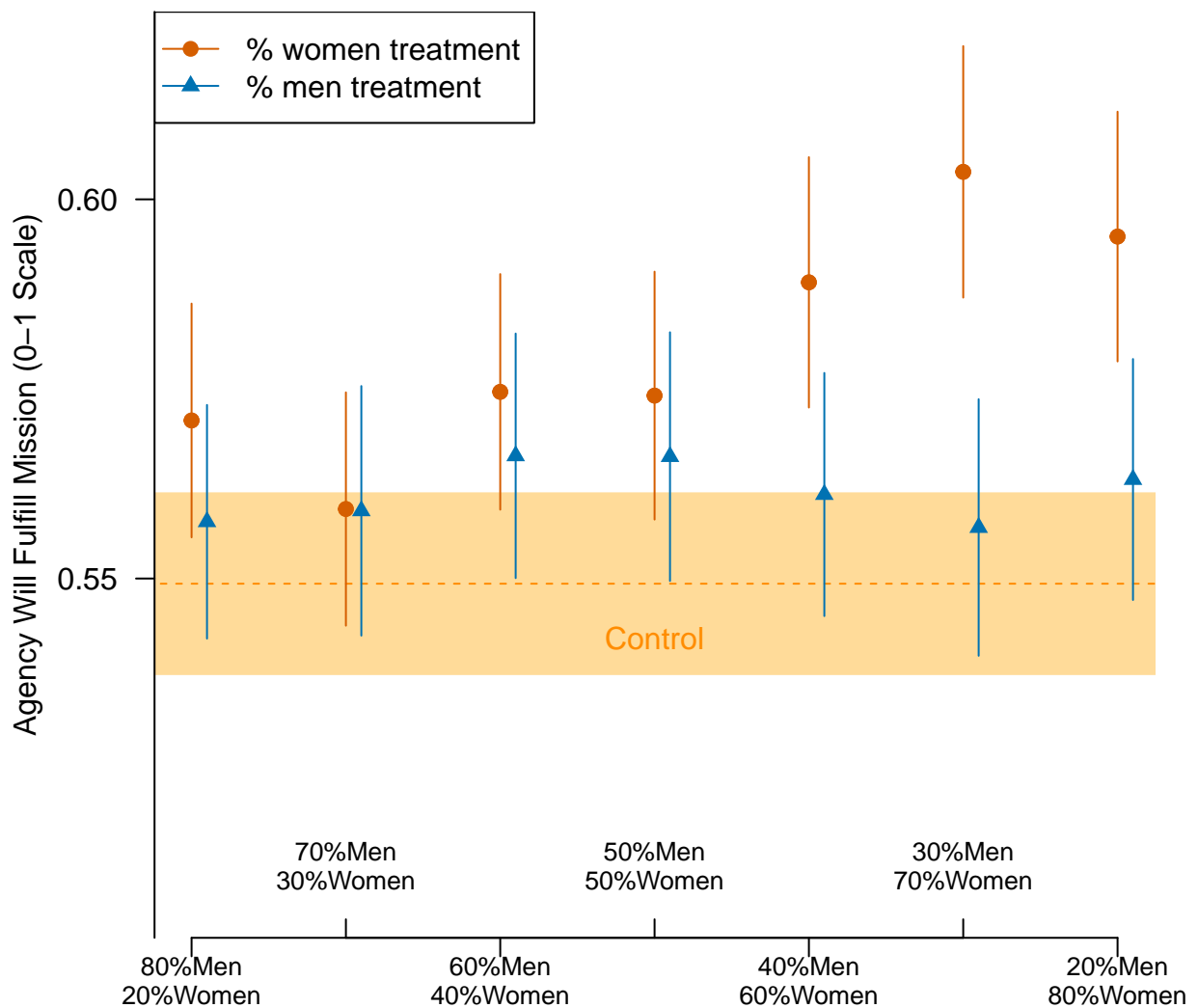


Figure 4: **Equivalence Frame Experiment: Perception Agency Will Fulfill its Mission.** The figure displays mean responses in the equivalence framing experiment (shapes are point estimates; bars are 95% confidence intervals). Respondents were told about an agency’s mission and then given either no information on the agency’s gender composition (control), told the agency was “ $X\%$  men”, or told the agency was “ $(100-X)\%$  women”, where  $X$  is a randomly drawn value from  $f(20,30,40,50,60,70,80)$ . As the figure shows, presenting information on gender composition in terms of “% women” rather than “% men” leads to higher confidence that the agency will fulfill its mission, on average, despite the fact that the information is logically equivalent.



## 6 Conclusion

Rhetoric on the importance of gender diversity is now commonplace in national political discourse. After centuries of nearly all male government, women have made rapid gains in assuming top federal posts, including the vice presidency, and presidents from both parties now extol the benefits of having women in positions in power. Despite this rhetoric, women remain severely underrepresented at all levels of the federal bureaucracy, and as our analysis shows, their advancement has been uneven, and slowed in part by Republican presidents who tend to appoint fewer women than their immediate Democratic predecessors. The glaring conflict between actions and words suggests the presence of cheap talk. In this paper, we provide new theory and evidence consistent with this concern.

Specifically, we outline a theory of *visible representation*, which holds that elites can impart the impression of concern for gender equity by emphasizing women in political communications, even absent any commitments or changes that advance women's welfare or level of representation. Our experiments are designed to provide an extremely tough test of this idea, and show that seemingly arbitrary changes in how information on the gender composition of government agencies is presented leads to sharply different perceptions not only of government's concern for women, but of government efficacy generally. In line with our predictions based on the well-known connection between the personal relevance of information and issue salience, these effects are most pronounced among women, who are likely the intended target of this brand of strategic communication.

To be sure, some efforts to center women in political rhetoric are sincere and well-meaning, and we do not mean to suggest this should be avoided. In many ways, the prominence of women and their newfound government authority in political discussions is a welcome change after such prolonged exclusion. However, our results suggest this strategy

can also be used cynically to inflate perceptions that government prioritizes gender equity even as it opposes the advancement of women. And because misperceptions can paint a rosier view of the status quo than is warranted, it is also possible such appeals can deflate demands for a more inclusive government.

There are several possible avenues to extend this line of research. Like all experiments, ours takes place in a particular context and it is possible that changes to this context could lead to very different results (Munger, 2019). At the time of data collection, the occupant of the Oval Office was a Democrat, which means respondents may have processed gender-related treatments pertaining to the staffing of the bureaucracy in ways that, for example, would have differed under the Trump Administration (e.g. appeals of this sort may have appeared more or less sincere based on the parties' reputations). Future iterations of these experiments during other periods in time, or across contexts which vary in terms of partisan control, could help to investigate this possibility. Adding partisan manipulations to the experimental design would also help to probe the conditional impact of emphasizing gender in this way. Dynamic experiments which randomize counter-messaging efforts from out-party members could also help to gauge whether the impact of such appeals can be easily neutralized or reversed.

Finally, though we focus on gender diversity in this paper, the theory of *visible representation* has potential implications for the study of other facets of diversity in government, including representation based on race, class, religion and sexual orientation. For example, previous studies have shown that White Americans overestimate racial progress toward economic equality (Kraus, Rucker and Richeson, 2017; Callaghan et al., 2021). It is possible that spotlighting government employees of color is contributing to similar misperceptions in terms of descriptive representation. Future work should apply the framework we have de-

veloped here to study perceptions of how government prioritizes other segments of society, and the resulting perceptual consequences. Despite some advances, government is still very far from reflecting the diversity of the population it serves on numerous dimensions. Despite this, it is possible that elite efforts to trumpet the relatively few members of marginalized groups in positions of power has created a false sense of descriptive representation in the mass public.

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# Online Appendix

## A Administrative Data

### A.1 Sources and Composition of Panel Data

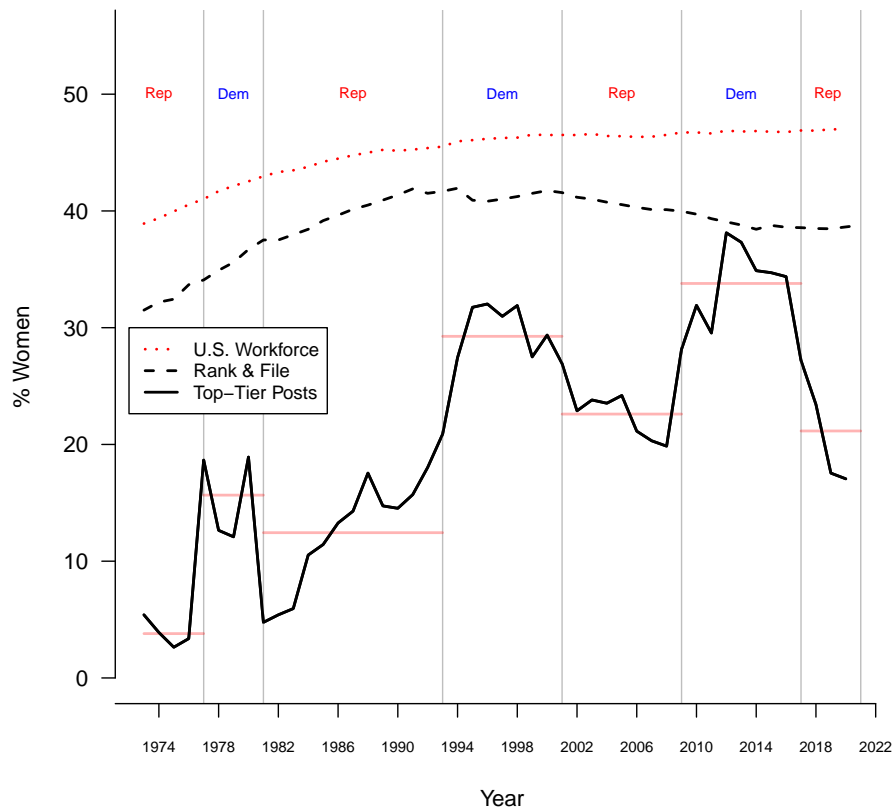
As we note in Section 3 of the paper, our analysis of rank and file and top-tier positions within executive branch agencies relies on government Handbooks and Plum books, which do not always provide complete information. For example, we are forced to exclude the Department of Energy from our analysis in 1981, a year in which the U.S. Government Manual was missing pages containing a personnel directory for that department. Our data analysis is also affected by the life cycles of agencies. For example, The Department of Health and Human Services first enters our panel in 1980, several months after the Department of Education Reorganization Act removed the education portions of the Department of Health, Education and Welfare (DHEW). (Prior to 1980, we include DHEW in both the top-tier and rank and file data sets; subsequently, HHS and Education replace this agency.) Similarly, the Department of Homeland Security enters our panel data in 2003, the first year in which rank and file data become available for that agency. While changing composition in a panel data set can sometimes cloud interpretation, we are confident the broad trends we discuss in the main text are robust, since an alternative analysis restricted only to top-tier positions that survive the entire period of 1973-2020 shows highly similar patterns (see Figure A1 below). We code top-tier positions based on Plum books for years 1996 through 2020, which can be accessed on The U.S. Government Publishing Office (GPO) website here: <https://www.govinfo.gov/collection/plum-book?path=/GPO/United%20States%20Government%20Policy%20and%20Supporting%20Positions%20%2528Plum%20Book%2529>. To access earlier years of the Plum Books, we used HathiTrust's digital library of GPO documents: <https://babel.hathitrust.org/cgi/mb?a=listis;c=1512554095>.

## **A.2 Validating Gender Coding**

To validate the gender identities of top-tier employees based on first names, we randomly sampled 100 observations and used web searches to locate mentions of pronouns and honorifics in public documents mentioning each official. We located pronouns and/or honorifics for 99 of the 100 observations, one of which was miscoded (accuracy = 98/99). We could not locate informative documents on Harold M. Grindle, who served as a U.S. Marshal in Iowa in 1977, who we code as a man. In cases where a man and a woman served in the same position in a given year, the position was coded as being filled by a woman. There are 81 of these cases across all years in our data set, which, excluding vacancies, roughly comprises 23,000 total observations.

## **A.3 Additional Results**

Figure A1: **Gender Representation in Federal Agencies Over Time Using Common Positions.** The figure replicates Figure 2 using only the 154 top-tier job titles that appear in each agency every year of the panel (roughly 5,400 observations).



## B Survey Experiment

### B.1 Sampling Procedure, Compensation and Ethical Considerations

Survey respondents contacted by Qualtrics were screened: with an attention check (displayed in Figure B1), and for age (over 18), and gender (men and women only, as pilot samples indicated a lack of statistical power to study other gender identities). Qualtrics also purged respondents who exhibited “speeding” behavior, completing the survey in less than 1/3 the median completion time as measured in the initial soft launch.

At the start of the survey, an introduction screen was displayed stating that this survey was part of a research project. It also provided information on the topic of the survey, informed respondents that their participation was voluntary and of the study’s risks, and provided contact information for the study’s authors and university officials. Identifying information on survey respondents was not collected. Elite interview participants provided their consent to participate in this research verbally before the start of each interview. Interview subjects are identified by name in our study if they gave consent to do so, but also had the option to have their statements attributed anonymously. These procedures were approved by our university’s Institutional Review Board.

Our equivalence framing experiment involves minor deception, which was necessary to evaluate how participants would respond to hypothetical gender compositions of federal agencies. All respondents were debriefed at the conclusion of the survey as to the nature of, and reason for, any inaccurate information conveyed; see Figure B9.

To determine levels of compensation for participants, we aimed to meet or exceed the current federal minimum wage, which is \$7.25/hour. In a pilot study conducted on the platform Prolific, we compensated respondents at a rate equivalent to \$14.12 per hour. The main survey sample used in our analysis was collected by the survey firm Qualtrics, which charged us \$4 per complete response. The mean completion time for this survey was 6.47 minutes, which translates to \$37.05 per hour. However, like all survey firms, Qualtrics

directly compensates participants without our involvement, and we do not control what portion of that money is received by participants.

Table B1: **Demographics of Experimental Sample.** The table displays descriptive statistics of respondents in our experimental sample relative to the U.S. population. National Party ID statistics are from the 2020 American National Election Studies. Partisan leaners coded as partisans. All other national data are recent U.S. Census estimates.

Variable	Sample (%)	U.S. (%)
Woman	50	51
Age (median years)	41	38
At Least BA	37	32
Hispanic	12	18
Non-Hispanic White	66	60
Non-Hispanic Black	12	12
Non-Hispanic Asian	5	6
Other Race	5	4
Democrat	42	46
Republican	41	42
Independent	18	12
$N$	5,171	

## B.2 Pre-Analysis Plan

The pre-registration of the experiments we conducted via Qualtrics was submitted on January 9, 2022, prior to the start of data collection. It includes a description of sampling procedures, hypotheses and a plan for analysis, and is available here: <https://aspredicted.org/nm4pk.pdf>. We note one error in the pre-analysis plan, which states that all randomizations in the equivalence framing experiment were fully independent across both respondents and survey items. This is true with the exception of the “job”/“top jobs” randomization, which was only randomized between respondents but remained fixed across the four items. This does not affect key tests, since the gender treatment was orthogonal to the jobs treatment by design.



### B.3 Gender as a Non-binary Construct

While the logic of our equivalence framing experiment invokes a binary construct of gender (i.e. men and women are assumed to sum to 100%), we stress that gender identity is not restricted in this way generally (Hyde et al., 2019), and need not remain fixed within persons over time (Galupo, Pulice-Farrow and Ramirez, 2017). However, we invoke this binary framework due to several features of the specific context under study. Our experiment is based on the categorizations which appear in federal data on employee gender, which do account for transgender identities. Specifically, the Office of Personnel Management’s (OPM) guidelines for keeping records pertaining to the personal information of employees, including gender identity, states that the category “men” includes transgender men, and the category “women” includes transgender women. These records are regularly updated to ensure they accurately reflect the gender identity of government employees who may have transitioned after starting to work for the federal government.<sup>14</sup> The remainder of employees are classified as ‘unspecified,’ but this accounts for far less than 1% of employees, and it can refer to missing or inconsistent data, not necessarily non-binary identity. To a first approximation, describing federal employees as being comprised of men and women is consistent with available (but admittedly, imperfect) administrative data.

### B.4 Survey Content

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<sup>14</sup>See here for more details on this policy: <https://www.opm.gov/policy-data-oversight/diversity-and-inclusion/reference-materials/guidance-regarding-employment-of-transgender-individuals-in-the-federal-workplace.pdf>

Figure B1: Attention Check

People are very busy these days and many do not have time to follow what goes on in the government. We are testing whether people read questions. To show that you've read this much, answer both "extremely interested" and "very interested."

- Extremely interested
- Very interested
- Moderately interested
- Slightly interested
- Not interested at all

Figure B2: Nominee Experiment Treatment Text

**White House:** President to nominate Alex Smith to lead  $\{e://Field/exp2\_agency\}$

WASHINGTON — The president will nominate Alex Smith as the next Secretary of the  $\{e://Field/exp2\_agency\}$ , the White House announced.  $\{e://Field/title\}$  Smith is an expert in  $\{e://Field/policy\}$  policy and has previously served in various high-level leadership positions in the federal government.

A  $\{e://Field/parent\}$  of two,  $\{e://Field/title\}$  Smith resides in Arlington, Virginia.

"Life is changing faster than at any point in human history,"  $\{e://Field/pronoun1\}$  said in a statement. "As a nation, we face a choice: shape the world around us, or get shaped by it. We cannot hide from the future."

Figure B3: Nominee Experiment Dependent Variables

How much confidence do you have in Alex Smith's ability to effectively lead the  $\{e://Field/exp2\_agency\}$ ?

No confidence at all      Not too much confidence      Some confidence      A lot of confidence

After reading about the announcement of Alex Smith, how much confidence do you have in the president's ability to fill the government with qualified and responsive public servants?

No confidence at all      Not too much confidence      Some confidence      A lot of confidence

Figure B4: Equivalence Framing Experiment: Dept. of Defense Treatment

Figure B5: Equivalence Framing Experiment: Dept. of Treasury Treatment

The mission of the U.S. Department of Treasury is to maintain a strong economy and create economic and job opportunities by promoting the conditions that enable economic growth and stability at home and abroad, strengthen national security by combating threats and protecting the integrity of the financial system, and manage the U.S. Government's finances and resources effectively.

In recent years, about \$ {e://Field/pct\_dose\_treas}% of \$ {e://Field/rank} in this agency have been held by \$ {e://Field/exp\_1\_gender\_treas}.

Figure B6: Equivalence Framing Experiment: Dept. of Education Treatment

The mission of the U.S. Department of Education is to promote student achievement and preparation for global competitiveness by fostering educational excellence and ensuring equal access.

In recent years, about \$ {e://Field/pct\_dose\_educ}% of \$ {e://Field/rank} in this agency have been held by \$ {e://Field/exp\_1\_gender\_educ}.

Figure B7: Equivalence Framing Experiment: Dept. of Health and Human Services Treatment

The mission of the U.S. Department of Health and Human Services is to enhance the health and well-being of all Americans, by providing for effective health and human services and by fostering sound, sustained advances in the sciences underlying medicine, public health, and social services.

In recent years, about  $\{e://Field/pct\_dose\_hhs\}$ % of  $\{e://Field/rank\}$  in this agency have been held by  $\{e://Field/exp\_1\_gender\_hhs\}$ .

Figure B8: Equivalence Framing Experiment: Dependent Variables. (Note: Agency names in these items matched the agency respondents read about immediately prior, but were otherwise identical. Items measuring confidence in the Dept. of Defense displayed below as an example.)

Figure B9: Debrief at conclusion of survey.

Thank you for participating in this survey. Please note the information about the gender composition of federal agencies was not necessarily accurate. Hypothetical numbers were supplied in order to test whether different gender compositions affected perceptions of government.

Please feel free to leave any comments or feedback below.

## B.5 Additional Experimental Results

Table B2: **Effects of Gender Treatment in Nominee Experiment By Agency.** The table below shows average treatment effects of using feminine pronouns relative to male in the nominee experiment conditioning on which agency respondents were assigned to read about.

	Nominee Effective	President Effective
	(a)	(b)
(Intercept)	0.600	0.583
	(0.010)	(0.011)
condition: feminine pronouns	0.032	0.012
	(0.015)	(0.015)
Agency: Education	0.017	0.007
	(0.014)	(0.016)
Agency: HHS	-0.004	0.017
	(0.014)	(0.016)
Agency: Treasury	-0.002	-0.011
	(0.014)	(0.015)
feminine pronouns * Education	-0.001	0.001
	(0.021)	(0.022)
feminine pronouns * HHS	0.023	0.009
	(0.021)	(0.022)
feminine pronouns * Treasury	0.011	0.023
	(0.021)	(0.022)
<i>N</i>	5171	5171

Robust standard errors in parentheses  
indicates significance at  $p < 0.05$

Figure B10: **Equivalence Frame Effects on Perception Agency Will Represent Best Interests of Women.** The plot below displays estimates of the difference in average responses between the percent men and percent women condition across doses of the experiment, i.e. estimates of  $\chi$  from Equation 1 in the main text.

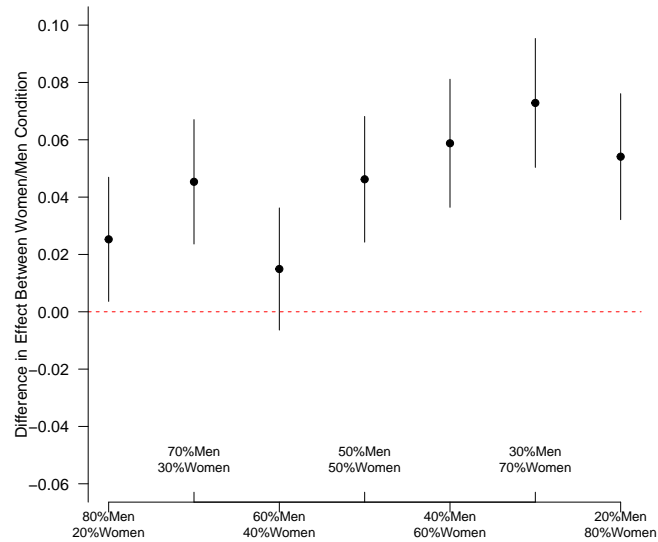
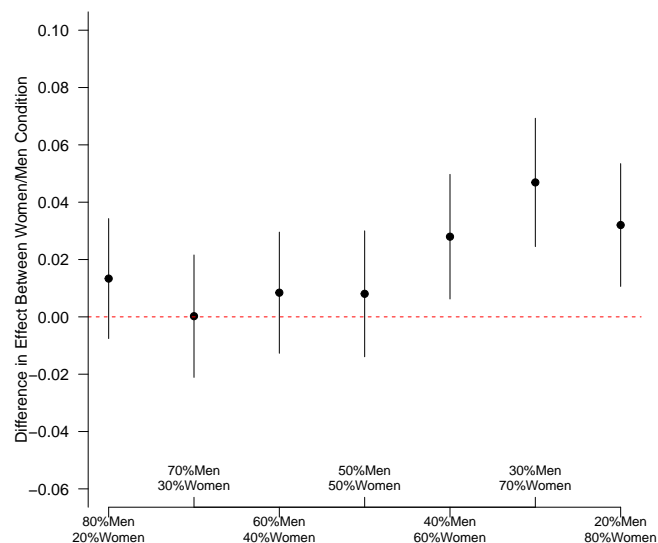


Figure B11: **Equivalence Frame Effects on Perception Agency Will Fulfill Mission.** The plot below displays estimates of the difference in average responses between the percent men and percent women condition across doses of the experiment, i.e. estimates of  $\chi$  from Equation 1 in the main text.



**Table B3: Effects of Gender Treatment in Dose Response Experiment By Agency and Rank.** The table below shows average treatment effects of emphasizing women (relative to men) in the dose response experiment pooled across all doses. Models (a) and (c) show average effects in the entire sample. Models (b) and (d) condition on the agency being described in a given survey item. Dependent variables were measured on four-point scales but transformed to range between 0 and 1 to ease interpretation.

	Represent Women's Interests			Fulfill Mission		
	(a)	(b)	(c)	(d)	(e)	(f)
(Intercept)	0.539 (0.006)	0.546 (0.007)	0.543 (0.006)	0.618 (0.005)	0.629 (0.007)	0.620 (0.006)
condition: control	0.004 (0.006)	0.005 (0.013)	0.005 (0.009)	-0.012 (0.006)	0.007 (0.012)	-0.019 (0.009)
condition: women	0.045 (0.004)	0.030 (0.008)	0.037 (0.006)	0.020 (0.004)	-0.012 (0.008)	0.016 (0.006)
Agency: Education	-0.006 (0.004)	-0.013 (0.007)	-0.006 (0.004)	-0.091 (0.004)	-0.106 (0.007)	-0.091 (0.004)
Agency: HHS	0.000 (0.004)	-0.010 (0.007)	0.000 (0.004)	-0.068 (0.004)	-0.082 (0.007)	-0.068 (0.004)
Agency: Treasury	-0.014 (0.004)	-0.023 (0.007)	-0.013 (0.004)	-0.075 (0.004)	-0.092 (0.007)	-0.075 (0.004)
Rank: 'top jobs'	0.004 (0.007)	0.004 (0.007)	-0.003 (0.008)	0.004 (0.006)	0.004 (0.006)	-0.001 (0.008)
control * Education		-0.009 (0.018)			-0.036 (0.018)	
women * Education		0.018 (0.012)			0.047 (0.012)	
control * HHS		0.003 (0.018)			-0.017 (0.018)	
women * HHS		0.022 (0.012)			0.036 (0.012)	
control * Treasury		0.006 (0.018)			-0.020 (0.017)	
women * Treasury		0.020 (0.012)			0.043 (0.012)	
control * 'top jobs'			-0.001 (0.013)			0.015 (0.013)
women * 'top jobs'			0.016 (0.009)			0.007 (0.008)
<i>N</i>	20684	20684	20684			

Robust standard errors clustered by respondent in parentheses

indicates significance at  $p < 0.05$

Table B4: **Effects of Gender Treatment in Dose Response Experiment By Order of Survey Item.** The table below shows average treatment effects of emphasizing women (relative to men) in the dose response experiment conditioning on the order in which a respondent saw the survey item (recall each respondent saw four items corresponding to four different agencies).

	Represent Women's Interests	Fulfill Mission
	(a)	(b)
(Intercept)	0.518 (0.006)	0.558 (0.006)
condition: control	0.025 (0.012)	0.007 (0.012)
condition: women	0.060 (0.008)	0.032 (0.008)
Order: 2	0.014 (0.007)	0.002 (0.007)
Order: 3	0.026 (0.007)	0.010 (0.007)
Order: 4	0.033 (0.007)	0.004 (0.007)
control * Order: 2	-0.022 (0.018)	-0.028 (0.018)
women * Order: 2	-0.001 (0.012)	-0.002 (0.012)
control * Order: 3	-0.027 (0.018)	-0.032 (0.018)
women * Order: 3	-0.024 (0.012)	-0.025 (0.012)
control * Order: 4	-0.034 (0.018)	-0.016 (0.018)
women * Order: 4	-0.037 (0.012)	-0.025 (0.012)
<i>N</i>	20684	20684

Standard errors clustered by respondent in parentheses

indicates significance at  $p < 0.05$



**Table B5: Effects of Gender Treatment on Perception Government Represents Women’s Interests, by Dose and Respondent Gender** The table below shows average treatment effects of emphasizing women (relative to men) conditioning on the dose given and respondent party ID.).

	80% Women 20% Men	70% Women 30% Men	60% Women 40% Men	50% Women 50% Men	40% Women 60% Men	30% Women 70% Men	20% Women 80% Men
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(Intercept)	0.570 (0.011)	0.562 (0.012)	0.576 (0.012)	0.574 (0.013)	0.568 (0.011)	0.545 (0.013)	0.545 (0.013)
condition: women	0.027 (0.016)	0.055 (0.016)	0.017 (0.016)	0.038 (0.016)	0.010 (0.015)	0.030 (0.017)	0.030 (0.017)
woman respondent	-0.033 (0.016)	-0.035 (0.017)	-0.061 (0.016)	-0.041 (0.017)	-0.053 (0.017)	-0.064 (0.017)	-0.064 (0.017)
women * woman respondent	0.054 (0.022)	0.037 (0.023)	0.083 (0.023)	0.013 (0.022)	0.010 (0.022)	0.029 (0.022)	0.029 (0.022)
<i>N</i>	2564	2540	2572	2574	2673	2577	2577

Robust standard errors clustered by respondent in parentheses  
indicates significance at  $p < 0.05$

**Table B6: Effects of Gender Treatment on Perception Agency Will Fulfill Mission, by Dose and Respondent Gender** The table below shows average treatment effects of emphasizing women (relative to men) conditioning on the dose given and respondent party ID.).

	80% Women 20% Men	70% Women 30% Men	60% Women 40% Men	50% Women 50% Men	40% Women 60% Men	30% Women 70% Men	20% Women 80% Men
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(Intercept)	0.573 (0.011)	0.571 (0.012)	0.569 (0.012)	0.581 (0.012)	0.577 (0.012)	0.568 (0.013)	0.568 (0.013)
condition: women	0.002 (0.016)	0.021 (0.017)	0.015 (0.017)	-0.001 (0.017)	0.011 (0.015)	-0.007 (0.016)	-0.007 (0.016)
woman respondent	-0.020 (0.016)	-0.029 (0.017)	-0.016 (0.016)	-0.028 (0.017)	-0.021 (0.016)	-0.017 (0.017)	-0.017 (0.017)
women * woman respondent	0.060 (0.022)	0.055 (0.023)	0.026 (0.022)	0.016 (0.022)	-0.005 (0.022)	0.014 (0.022)	0.014 (0.022)
<i>N</i>	2564	2540	2572	2574	2673	2577	2577

Robust standard errors clustered by respondent in parentheses  
indicates significance at  $p < 0.05$

Table B7: **Effects of Gender Treatment on Perception Government Represents Women’s Interests, by Dose and Respondent Party.** The table below shows average treatment effects of emphasizing women (relative to men) conditioning on the dose given and respondent party ID.).

	80% Women 20% Men	70% Women 30% Men	60% Women 40% Men	50% Women 50% Men	40% Women 60% Men	30% Women 70% Men	20% Women 80% Men
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(Intercept)	0.517 (0.013)	0.520 (0.013)	0.511 (0.013)	0.540 (0.013)	0.532 (0.013)	0.518 (0.013)	0.518 (0.013)
condition: women	0.063 (0.017)	0.062 (0.018)	0.053 (0.018)	0.033 (0.017)	-0.004 (0.017)	0.017 (0.017)	0.017 (0.017)
Independent	0.000 (0.023)	-0.056 (0.024)	-0.034 (0.023)	-0.041 (0.024)	-0.058 (0.023)	-0.070 (0.024)	-0.070 (0.024)
Democrat	0.089 (0.018)	0.089 (0.019)	0.096 (0.018)	0.046 (0.018)	0.048 (0.018)	0.015 (0.019)	0.015 (0.019)
women * Independent	-0.042 (0.032)	0.066 (0.032)	-0.011 (0.033)	0.001 (0.032)	0.049 (0.031)	0.048 (0.031)	0.048 (0.031)
women * Democrat	0.003 (0.024)	-0.004 (0.025)	0.015 (0.025)	0.032 (0.024)	0.022 (0.024)	0.047 (0.024)	0.047 (0.024)
<i>N</i>	2564	2540	2572	2574	2673	2577	2577

Robust standard errors clustered by respondent in parentheses  
indicates significance at  $p < 0.05$

Table B8: **Effects of Gender Treatment on Perception Agency Will Fulfill Mission, by Dose and Respondent Party.** The table below shows average treatment effects of emphasizing women (relative to men) conditioning on the dose given and respondent party ID.).

	80% Women 20% Men	70% Women 30% Men	60% Women 40% Men	50% Women 50% Men	40% Women 60% Men	30% Women 70% Men	20% Women 80% Men
	(a)	(b)	(c)	(d)	(e)	(f)	(g)
(Intercept)	0.509 (0.013)	0.515 (0.014)	0.503 (0.013)	0.514 (0.013)	0.521 (0.013)	0.540 (0.013)	0.540 (0.013)
condition: women	0.032 (0.018)	0.036 (0.018)	0.029 (0.018)	0.006 (0.017)	0.007 (0.017)	-0.027 (0.017)	-0.027 (0.017)
Independent	0.013 (0.023)	-0.039 (0.024)	-0.004 (0.023)	-0.019 (0.023)	-0.015 (0.023)	-0.064 (0.024)	-0.064 (0.024)
Democrat	0.121 (0.017)	0.123 (0.019)	0.140 (0.017)	0.129 (0.018)	0.116 (0.018)	0.074 (0.018)	0.074 (0.018)
women * Independent	-0.040 (0.031)	0.056 (0.032)	-0.029 (0.032)	0.004 (0.032)	0.012 (0.031)	0.071 (0.031)	0.071 (0.031)
women * Democrat	0.025 (0.023)	0.003 (0.025)	0.006 (0.024)	0.007 (0.024)	-0.005 (0.023)	0.038 (0.024)	0.038 (0.024)
<i>N</i>	2564	2540	2572	2574	2673	2577	2577

Robust standard errors clustered by respondent in parentheses  
indicates significance at  $p < 0.05$

## B.6 Pilot Study

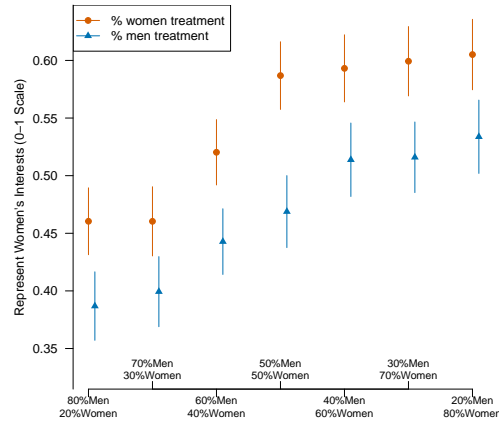
We fielded a pilot study on the platform Prolific in December 2021. The results closely mirror the ones obtained from the core results discussed in the main text, which were obtained via the vendor Qualtrics in January 2022.

Table B9: Effects of Gender Treatment in Nominee Experiment. The table below shows average treatment effects of using feminine pronouns relative to male in the nominee experiment pooled across all doses. Models (a) and (d) show average effects in the entire sample. Models (b)-(c) and (e)-(f) condition on respondent party and gender, respectively. Dependent variables were measured on four-point scales but transformed to range between 0 and 1 to ease interpretation.

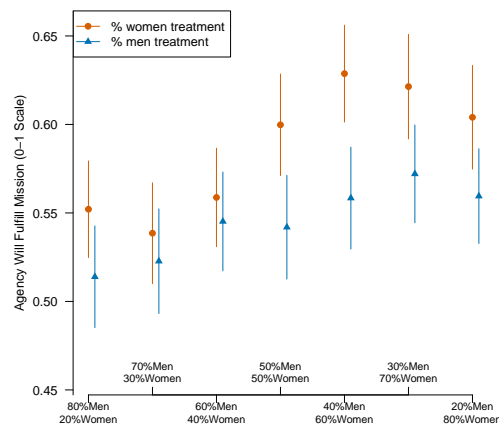
	Nominee Effective			President Effective		
	(a)	(b)	(c)	(d)	(e)	(f)
(Intercept)	0.618 (0.005)	0.604 (0.011)	0.610 (0.007)	0.609 (0.005)	0.570 (0.012)	0.599 (0.007)
condition: feminine pronouns	0.073 (0.007)	0.019 (0.017)	0.058 (0.010)	0.053 (0.007)	-0.001 (0.018)	0.042 (0.011)
Independent		-0.064 (0.019)			-0.056 (0.020)	
Democrat		0.035 (0.013)			0.071 (0.014)	
feminine pronouns x Independent		0.042 (0.026)			0.052 (0.027)	
feminine pronouns * Democrat		0.077 (0.018)			0.075 (0.020)	
woman respondent			0.018 (0.010)			0.020 (0.010)
feminine pronouns * woman respondent			0.030 (0.014)			0.022 (0.014)
<i>N</i>	4307	4304	4307	4307	4304	4307

Robust standard errors in parentheses  
indicates significance at  $p < 0.05$

**Figure B12: Equivalence Frame Results in Pilot Study: Perception Agency Will Represent Best Interests of Women.** The figure displays mean responses in the equivalence framing experiment in our pilot study fielded on Prolific (shapes are point estimates; bars are 95% confidence intervals). Respondents were told about an agency’s mission and then told the agency was “ $X\%$  men”, or told the agency was “ $(100-X)\%$  women”, where  $X$  is a randomly drawn value from  $f(20,30,40,50,60,70,80)$  (note: there was no pure control condition in this pilot version).



**Figure B13: Equivalence Frame Results in Pilot Study: Perception Agency Will Fulfill Its Mission.** The figure displays mean responses in the equivalence framing experiment in our pilot study fielded on Prolific (shapes are point estimates; bars are 95% confidence intervals). Respondents were told about an agency’s mission and then told the agency was “ $X\%$  men”, or told the agency was “ $(100-X)\%$  women”, where  $X$  is a randomly drawn value from  $f(20,30,40,50,60,70,80)$ .



## B.7 Additional Experiment

We conducted an experiment designed to test whether various visualizations of gender composition in the executive branch changed perceptions of descriptive representation and government competence. To do this, we randomly assigned participants to view one of four versions of visualizations of data on gender composition over time similar to Figure 2 in the main text (omitting demarcations for presidential administrations and partisan labels) and accompanying text. However, across conditions, accompanying text was added to emphasize trends in women’s representation vs. levels to varying degrees. Condition 1 (omitted as a reference category in the regressions in Table B10), portrayed a time series showing the share of women in top-tier government positions. The accompanying text emphasized changes over time, and read: “The plot below shows women’s representation in top-tier jobs in federal agencies over time. As the plot shows, the share of top-tier jobs held by women was about 2% in 1973 and about 26% in 2020.” Condition 2 featured the same time series with text that emphasized current levels over changes: “The plot below shows women’s representation in top-tier jobs in federal agencies over time. As the plot shows, the share of top-tier jobs held by women was about 26% in 2020.” Condition 3 added to the plot a time series showing the share of rank and file jobs held by women, and had accompanying text emphasizing current levels: “The plot below shows women’s representation in federal agencies over time. The share of top-tier jobs held by women was about 26% in 2020. For reference, the share of rank and file jobs—that is, jobs not in the top tier— held by women was about 39% in 2020.” Condition 4 further added the time series showing the share of the total U.S. workforce occupied by women over time, and had accompanying text emphasizing current levels: “The plot below shows women’s representation in federal agencies over time. The share of top-tier jobs held by women was about 26% in 2020. For reference, the share of rank and file jobs—that is, jobs not in the top tier— held by women was about 39% in 2020. The share of jobs made up by women in the total U.S. workforce was 47% in the same year.” The results of this analysis are displayed below. Our pre-registered hypotheses were that emphases on levels over changes would decrease perceptions

that women had adequate representation in government, and decrease perceptions that government was generally effective. As Table B10 shows, results showed mixed support for these hypotheses: relative to condition 1, condition 4, which was designed to maximize emphasis on levels over changes, caused a 2.2-point drop in perceptions of government efficacy, in line with our predictions ( $p < 0.05$ ). However condition 4 also caused a 2.2-point increase in perceptions that women had adequate representation ( $p < 0.05$ ). No other conditions yielded statistically significant results, and we saw no heterogeneity by respondent party and gender. In retrospect, we speculate that participants may have had difficulty interpreting visualizations of these statistics, but further refinement and testing is required. In addition, we subsequently improved the accuracy of our administrative data set which altered the trends visualized at the time this experiment was deployed. For these reasons, we omit the experiment from the main text, but discuss it here for the sake of transparency.

Table B10: **Effects of Emphasizing Levels over Trends in Government Statistics.** The table below shows average treatment effects of presenting data on gender composition in the executive branch in ways that emphasize levels over trends. Models (a) and (d) show average effects in the entire sample. Models (b)-(c) and (e)-(f) condition on respondent party and gender, respectively.

	Government Effective			Enough Women in Government		
	(a)	(b)	(c)	(d)	(e)	(f)
(Intercept)	0.510 (0.008)	0.437 (0.012)	0.510 (0.011)	0.369 (0.006)	0.419 (0.010)	0.394 (0.009)
Condition: 2	-0.004 (0.011)	0.002 (0.017)	-0.001 (0.016)	0.005 (0.009)	-0.016 (0.013)	0.010 (0.012)
Condition: 3	-0.021 (0.011)	-0.004 (0.017)	-0.026 (0.016)	0.007 (0.009)	-0.012 (0.013)	0.006 (0.012)
Condition: 4	-0.022 (0.011)	-0.021 (0.017)	-0.013 (0.016)	0.022 (0.009)	0.007 (0.013)	0.023 (0.012)
Independent		0.022 (0.022)			-0.058 (0.016)	
Democrat		0.160 (0.017)			-0.092 (0.014)	
Condition 2 * Independent		-0.018 (0.030)			-0.000 (0.022)	
Condition 3 * Independent		-0.036 (0.031)			0.009 (0.024)	
Condition 4 * Independent		0.008 (0.031)			-0.010 (0.022)	
Condition 2 * Republican		0.000 (0.023)			0.044 (0.019)	
Condition 3 * Democrat		-0.016 (0.023)			0.036 (0.019)	
Condition 4 * Democrat		0.003 (0.023)			0.035 (0.019)	
woman respondent			-0.001 (0.015)			-0.052 (0.012)
Condition 2 * woman respondent			-0.006 (0.022)			-0.008 (0.017)
Condition 3 * woman respondent			0.010 (0.022)			0.004 (0.017)
Condition 4 * woman respondent			-0.019 (0.022)			-0.001 (0.017)
<i>N</i>	5171	5171	5171	5171	5171	5171

Robust standard errors in parentheses  
indicates significance at  $p < 0.05$