The Contingent Effects of Candidate Sex on Voter Choice

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Abstract

A prominent explanation for why women are significantly underrepresented in public office in the U.S. is that stereotypes lead voters to favor male candidates over female candidates. Yet whether voters actually use a candidate's sex as a voting heuristic in the presence of other common information about candidates remains a surprisingly unsettled question. Using a conjoint experiment that controls for stereotypes, we show that voters are biased against female candidates but in some unexpected ways. The average effect of a candidate's sex on voter decisions is small in magnitude, is limited to presidential rather than congressional elections, and appears only among male voters. More importantly, independent voters have the greatest negative bias against female candidates. The results suggest that partisanship works as a kind of "insurance" for voters who can be sure that the party affiliation of the candidate will represent their views in office regardless of the sex of the candidate.

The number of female candidates running for elective office in the United States has been increasing for decades, but women are still underrepresented in politics compared to men. Women hold fewer than one in five congressional seats despite the fact that women compose a majority of the U.S. population. Why is there such an immense disparity in descriptive representation? One prominent answer is that voters are biased against female candidates. When asked directly, around 20 percent of respondents in the United States answer that they believe men make better political leaders than do women.[1] Even attempts to elicit sensitive attitudes in a more honest manner find a segment of the population hostile to seeing a woman as president Burden, Ono, and Yamada 2017; Streb et al. 2008). Yet the reasons for this bias remain unclear.

Theory suggests that voters might use candidate sex as a proxy for other information that actually affects how they vote. Voters frequently make decisions based on heuristics or information cues (Lupia and McCubbins 1998; Popkin 1991), so those who are biased against (or toward) female candidates might readily use candidate sex as a shortcut that implies other information about candidates. This is often done through stereotyping. Although voters do not necessarily assign feminine attributes to female candidates (Bauer 2017; Brooks 2013; Dolan 2014; Schneider and Bos 2014), voters often stereotype candidates based on their gender and associate certain personality traits and policy positions with men and women (Alexander and Andersen 1993; Huddy and Terkildsen 1993; Kahn 1994; Koch 2002; Lawless 2004; McDermott 1997; Sanbonmatsu and Dolan 2009; Sapiro 1981). For example, lacking direct knowledge of such things, a voter might assume that a female candidate is more focused on domestic policy

[1] This result was drawn from the World Values Survey Wave 6, conducted in the United States in 2011 (http://www.worldvaluessurvey.org/WVSDocumentationWV6.jsp).

issues such as education or that a male candidate is more experienced.

At the same time, candidate sex is only one of many information cues that are available to voters. It is likely that other important cues overwhelm the effect of candidate sex on voting decisions. Political party is the most likely of these cues. Scholars have documented that politics is becoming highly polarized along party lines not only at the elite level but also at the mass level, a trend that makes party a more useful diagnostic for how a candidate would act in office. The polarization of partisans spills over beyond political choices and even exerts a significant influence on social judgments and economic behavior (Iyengar, Sood, and Lelkes 2012; Iyengar and Westwood 2015; Mason 2015; McConnell et al. 2017). For partisan voters who have hostile feelings toward the opposing party, a candidate's party affiliation might be a determinative cue for their choice of candidates that overwhelms other information about candidates. Even if stereotypes are influential amidst strong party cues, it remains unknown whether voters also discriminate against female candidates based on sex *per se*.

Our contribution in this manuscript is threefold. First, and most importantly, using an original conjoint experiment, we uncover the direct effect of candidate sex on voter decisions after accounting for various other information about candidates, especially their partisanship and gender stereotyped attributes. Our research design, which is relatively new in political science, enables us to not only to more closely reflect how candidates are presented to voters than do traditional survey experiments by jointly varying numerous candidate attributes at a time, but also to identify the extent to which candidate sex matters in voter evaluation *relative to* other crucial cues about candidates. Second, we manipulate the level of office that candidates in our experiment are seeking, to assess whether the bias toward female candidate varies between congressional and presidential elections. No experiment has tested whether voters' treatment of

male and female candidates depend on the political office being sought. Our experiment provides a unique opportunity to test the theory of gender-office congruency. Third, we demonstrate how the marginal effect of candidate sex varies across subgroups within the population by carefully scrutinizing the interactions of candidate sex with voters' background characteristics such as gender and partisanship. While the gender-affinity effect has been tested extensively in the literature, only limited attention has been paid to whether same-gender voting still appears when party cues are present. To mimic the different role that party plays in primary and general elections, our conjoint experiment also randomly creates the context of electoral competition where a pair of candidates shown to voters either shares or does not share the same party label. This enables us to identify whether and to what extent a candidate's party label helps partisan voters to overcome bias against male or female candidates.

To preview the results, we find that voters use candidate sex as a heuristic even when provided with information on other attributes of candidates such as party affiliations and policy positions. Voters are generally biased against female candidates and punish them compared to an identical male candidate. Although the average effect of a candidate's sex on vote choice is relatively small in magnitude compared to the effects of information about party affiliations and policy positions, its impact on election outcomes could be decisive in tight races such as the 2016 presidential elections where small margins of votes separate the candidates. This reality might deter women away from running for elected office in the first place.

At the same time, the bias against female candidates appears only among male voters and is limited to presidential rather than congressional elections. The results of our study further reveal that independent voters, who do not rely on a candidate's party affiliation as a cue, have the greatest negative bias against female candidates among the public. Moreover, Republican

voters lose their hostility toward female candidates when candidates can be differentiated by a party label, while Democratic voters do not use candidate sex as a voting heuristic in any context. This finding suggests that partisanship works as a kind of "insurance" for Republican voters who can be confident that the party affiliation of the candidate will represent their views in office regardless of the sex of the candidate. This further implies that the particularly acute underrepresentation of women in the Republican Party may be partly driven by the biases that female candidates are likely to face in primary elections, where the party label is not a point of differentiation.

Candidate Sex and Voters' Evaluation of Candidates

Previous studies suggest that voters make inferences based on a candidate's sex (McDermott 1997). For instance, voters often presume that female candidates lack masculine traits such as competence and strong leadership, traits that are often considered to be significant for elected officials to achieve success in politics (Alexander and Andersen 1993; Huddy and Terkildsen 1993; Lawless 2004; Schneider and Bos 2014). Some studies argue that such gender stereotypes lead voters to favor male candidates over female candidates (Dolan, Deckman, and Swers 2015; Lawless 2004). In contrast, others claim that gender stereotypes exert almost no influence on the evaluation of female candidates among voters (Brooks 2013) and that party and issue cues are weightier than gender stereotypes (Anderson, Lewis, and Baird 2011; Dolan 2014a, 2014b; Hayes 2011; Matland and King 2002; Thompson and Steckenrider 1997).

Female candidates are also assumed to be able to deal more effectively with "women's issues," such as those concerned with the environment, education, and healthcare, while male candidates are viewed to be well suited to deal with issues such as defense, crime, and the economy (Dolan 2010; Huddy and Terkildsen 1993; Kahn 1994; Sanbonmatsu and Dolan 2009).

Not only are male and female candidates thought to be interested in different policy areas, but they are also considered to have different stances on those issues. Voters in particular tend to think female candidates are more liberal and progressive than their male counterparts on various issues (Koch 2000; Sapiro 1981).

As important as these perceptions are, they are distinct from the direct effects of candidate sex that result from a voter's "baseline gender preference" (Sanbonmatsu 2002). While scholars generally agree that voters have certain gender stereotypes toward men and women running for public office, it remains an unsettled question whether candidate sex has an independent effect on voter evaluation. Failure to account for stereotypes and other candidate characteristics makes it ambiguous as to whether female candidates are disadvantaged compared to their male counterparts. We hope to resolve three key sources for this ambiguity.

First of all, if voters display a bias against female candidates, it might be because they dislike the idea of women in office per se – a "baseline gender preference" for male politicians – or because they associate female politicians with stereotypes such as passivity and a focus on issues such as health care that they value less than male-linked stereotypes such as strong leadership style and a focus on economic policy. In addition, during electoral campaigns, voters receive other significant information about candidates, including characteristics such as party affiliation, policy positions, personal background, and polling results (Lau and Redlawsk 2006). Because voters often enter the campaign with ideological orientations, issue preferences, and attachments to particular parties, information about these attributes of candidates may play a more significant role than candidate sex in deciding their vote choice even if voters have certain stereotyped views toward men and women running for electoral office. This leads to a testable hypothesis that voter do not use candidate sex as a voting heuristic after accounting for

stereotypes and other candidate characteristics.

Any "baseline gender preference" that exists within the population might vary across subgroups. The literature has paid particular attention to the difference between male and female voters to examine whether female voters support female candidates at higher rates than do male voters due to "gender affinity" (Dolan 2008; Rosenthal 1995; Sanbonmatsu 2002). The gender affinity effect has received mixed support in the literature. Some studies show that women do not necessarily vote for female candidates more than they do for male candidates (Ekstrand and Eckert 1981; Higgle et al. 1997; Lynch and Dolan 2014; Sapiro 1981) and that this effect is limited under the presence of policy issue cues (Anderson, Lewis, and Baird 2011). Our study is able to resolve whether there is a baseline preference for candidates of one sex or the other for both male and female voters.

Second, female candidates appear to face a greater challenge when they run for executive office than when they run for legislative office (Huddy and Terkildsen 1993; Lawrence and Rose 2014; Rose 2013). The common explanation for the difference across offices also hinges on stereotypes in that voters may perceive male candidates are more likely to have characteristics such as strong leadership and to emphasize issues such as foreign policy that align well with expectations of presidents, while female candidates are more likely to be seen as compassionate and emphasizing domestic issues such as health care and education that are well-suited to being a legislator (Eagly and Karau 2002; Kahn 1996; Koch 2002; Sapiro 1981). This "gender-office congruency theory" thus generates a hypothesis that the use of candidate sex as a voting heuristic among voters does not vary across political offices being sought when we isolate the effect of candidate sex from stereotypes that voters associate with male and female politicians.

The third question we address is the degree to which partisanship dominates other factors. Partisanship has been considered as the most important factor behind most voting decisions; in the contemporary polarized environment, party labels convey a lot of information and might leave little room for partisan voters to rely on candidate sex. We analogize that voting for a co-partisan provides a kind of "insurance" that essentially guarantees how a politician will act in office. This leads to a hypothesis that independents, who do not have any attachments to particular parties, are more likely to rely on candidate sex when they evaluate candidates and to exhibit the greatest bias against female candidates among voters.

But this effect may be limited to general elections where party labels differentiate candidates. Candidate sex is likely to operate differently in a primary where voters make choices between two competing candidates of the same party. For Democrats, candidate sex does not convey as a clear ideological signal; thus, the effect of candidate sex is expected to be marginal regardless of a candidate's party label. In contrast, Republicans tend to view female candidates more liberal than comparable male candidates, which might lead them to withdraw their support to female candidates unless a party signal differentiates the two competing candidates (see King and Matland 2003). This implies that both Democrats and Republicans do not rely on candidate sex when the party label is a point of differentiation, and that candidate sex has different effects between them when they choose a candidate from those running from the same party.

Research Design

It is challenging to isolate gender effects in observational data where female candidates might have been selected differentially during the recruitment process (Dolan and Sanbonmatsu 2011). The quality of emerging female candidates indeed differs significantly from their male counterparts (Anzia and Berry 2011; Fox and Lawless 2010; Lawless and Pearson 2008).

Candidates are also strategic actors whose anticipation of the electorate's response can shape their decisions. Thus, an extensive amount of research has conducted survey experiments to understand the effect of candidate sex on voter decisions (e.g., Bauer 2016; Brooks 2013; Fridkin, Kenney, and Woodall 2009; Iyengar et al. 1996; Kahn 1994; Sanbonmatsu 2002; Sapiro 1981). These experimental studies contribute much to our understanding by intentionally manipulating candidate profiles and behavior. We build on these studies by varying more candidate attributes simultaneously and randomizing the order of those attributes.

We test the hypotheses laid out above using a conjoint survey experiment. Recently introduced to political science, conjoint experiments were widely used in marketing to assess the impact of many product characteristics simultaneously. Unlike more familiar factorial designs, conjoint experiments vary all treatments simultaneously to allow for assessment of the impact of the independent and interactive effects of multiple variables on a common outcome metric without sacrificing much statistical power or imposing assumptions about functional form (Hainmueller, Hopkins, and Yamamoto 2014). This degree of power and flexibility is appealing in our application because it allows us to randomly vary many more candidate traits than have previous studies. This permits us not only to separate the baseline effect of candidate sex from the other characteristics such as gender stereotypes or partisanship that voters might infer, but also to assess simultaneously the relative importance of these factors on voter evaluation.

In our experiment, we present each subject with a pair of opposing candidates whose profiles are randomly generated from the set of characteristics, and then ask him/her to choose between the two candidates. Although some studies give each subject only one candidate at a time to evaluate, presenting two opposing candidates is more realistic as it mimics the decision that voters must make on real ballots. We asked respondents which candidate they would vote for

if it was an actual election, a familiar task for most of the electorate. The profiles of candidates are created in line with the existing literature on voter decisions as well as gender stereotypes more specifically (Lau and Redlawsk 2006; Lynch and Dolan 2014). We manipulate candidate attributes within four broad categories of information that a voter might encounter in a salient campaign: personal information, party information, issue information, and polling information.

First, to vary **personal information** that describes a candidate's backgrounds and personality in the candidate profiles, we include a candidate's sex, race/ethnicity, age, marital status, experience in public office, and salient personality trait. These attributes have been considered to play an important role when voters make decisions. For instance, scholars have paid extensive attention to the effect of a candidate's race on voter decisions in expectation that black candidates are disadvantaged compared to white candidates. We are especially interested in personality traits because, in the absence of direct information, these are the stereotypes that voters are most likely to ascribe to male and female candidates. These perceptions rather than sex itself might drive voting choices. For example, the perceived competence and personality traits of candidates have been discussed as possible sources of disadvantage to women running for public office (Fridkin and Kenney 2011). Most importantly, as noted above, male candidates are often viewed to be more decisive and stronger leaders than female candidates. Hence, having experience in public office may help female candidates fend off criticism over the lack of competence toward them; and having personality traits that contradict their gender stereotypes may alleviate bias against female candidates. The personality traits of candidates are adopted from survey questions conducted by the American National Election Studies that routinely ask whether candidates provide strong leadership, are compassionate, are honest, are intelligent, are knowledgeable, and really care about people like you.

Second, many American voters have psychological attachments to one of the major political parties, making it natural to rely on **party information** about candidates. Some recent studies suggest that, even if voters hold gendered attitudes, they are still heavily influenced by a candidate's party label rather than a candidate's sex when they decide for whom to vote (Anderson, Lewis, and Baird 2011; Dolan 2014a; Falk and Kenski 2006; Hayes 2011; Matland and King 2002). Hence, we include a candidate's party label as an essential attribute to vary in the candidate profiles. Importantly, by varying the party labels for both candidates, we are able to investigate the effects of candidate sex when the candidates are from opposing parties (as in a general election) and when they are from the same party (as in a primary election).

Third, the effect of candidate sex on voter decisions may be dampened when **issue information** such as a candidate's policy positions and expertise is given to voters. Female candidates are often seen to have different policy priorities and preferences from their male counterparts (Swers 2002). The issue information attributes in the candidate profiles include a candidate's positions on abortion, immigration, the federal budget deficit, and national defense. In addition, to distinguish positions from emphasis, we include the following six policy areas as varying attributes to describe the policy specialization of candidates: economic policy, foreign policy, public safety (crime), education, health care, and the environment.

Fourth, and finally, we vary **polling information** that describes a candidate's popular support in the public. Voters have been known to rely on polling data as a sign of the relative desirability of candidates. Therefore, they may engage in strategic voting behavior by jumping on the bandwagon when one candidate is performing well in the polls. Voters with such incentives may pay attention to the public opinion when they evaluate candidates. The reported favorability rating of each candidate is randomly varied among five levels from relatively

unpopular (34%) to highly popular (70%).

Table 1 summarizes all the attributes of candidate profiles used in our experiment. There is a total of 13 varying attributes. Some attributes take only two values, as in the case of partisanship (Democrat or Republican), whereas others take on several values, as in the case of polling favorability (five values ranging from 34% to 70%). For each profile, we randomly assign a value of each attribute. This research design yields 9,953,280 possible combinations of candidate profiles. The use of a conjoint experiment rather than a factorial design makes it possible to allow all of these combinations to be realized and to estimate the effect of each attribute with a modest number of observations.

[Table 1 about here]

Our experiment asks respondents to review the profiles of two candidates that are randomly created from the set of attributes and then to choose between them. This evaluation task is repeated ten times, with each pair of candidates displayed on a new screen. The categories of attributes of candidates such as age and experience in office are shown in randomized order across respondents so that the exercise does not inadvertently focus respondent attention on specific attributes.[2] Because so many attributes are varied, we think it is unlikely that respondents would be able to surmise the purpose of the experiment and behave strategically rather than simply choosing the candidate that seems most appealing.

Figure 1 presents an example of one set of congressional candidate profiles that was shown to a respondent in our experiment. The visual presentation mimics the one used by Hainmueller, Hopkins, and Yamamoto (2014) and these examples illustrate how types of

[2] The order is fixed across ten pairs for each respondent to minimize his or her cognitive burden.

attributes are varied across respondents.[3]

[Figure 1 about here]

In addition to varying attributes of the candidates, we also vary the office being sought to examine whether candidate sex has a different effect on voter decisions between presidential and congressional elections. Specifically, we split the ten pairs of candidates being evaluated into five sets of congressional candidates and five sets of presidential candidates, and ask respondents to evaluate candidates both for president and for Congress. The order of evaluation is randomly determined across respondents. Hence, approximately half respondents in our experiment first evaluated five pairs of candidates for president and then moved on to evaluating another five pairs of candidates for the House of Representatives; the remaining respondents evaluated the two groups in the reversed order.[4]

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[3] This design creates some combinations of candidate attributes that would be rare in real elections. For instance, voters seldom encounter a candidate who is female, black, Republican, pro-choice, and who wants to increase taxes. Such implausible combinations may introduce some biases to the results by leading our subjects to make artificial judgments without much cognitive effort (Auspurg, Hinz, and Liebig 2009). However, as we show in the appendix, the likelihood of having implausible combinations is limited, and the results remain almost the same even after excluding those combinations. We address this issue at greater length in the appendix using response timers to assess whether respondents take the experiment less seriously when candidates' policy positions seem incongruent with their party affiliations.

[4] We randomize the order of evaluation in this way to mitigate the concern that respondents may change their behavior when they evaluate the latter five pairs of candidates.

Data and Method of Analysis

We collected data through an online survey experiment that was fielded in March 2016. The sample of voting-eligible adults in the United States was drawn by Survey Sampling International (SSI).[5] In collecting the data, we stratified the sample by the region of residence (Northeast, Midwest, South, and West), sex (male and female), race/ethnicity (white, black, Hispanic, Asian, and others), and age groups, based on the latest U.S. Census data. To be more specific, we first asked demographic screening questions to 3,152 people in the SSI panel, and then invited 1,733 respondents among them to our survey according to fixed quotas so that the total sample matches the adult U.S. Census population on age, sex, geographic region, and race/ethnicity.[6] In the survey, we also collected data of other personal information about respondents such as educational background, social class, partisanship, political interest, and

[5] SSI samples of this kind have been used in a variety of survey studies published in top tier journals in political science (Berinsky, Margolis, and Sances 2014; Bullock 2011; Iyengar and Westwood 2015; Kam 2012; Malhotra, Margalit, and Mo 2013).

[6] Some might be concerned that actual voters may differ from the overall adult population. While our survey does not directly ask respondents whether they have cast a ballot in the general election, we have a measure of their political interest. The turnout and political interest are indeed highly correlated. According to data from the 2012 ANES, 92% of people who are very interested in politics report they voted for the election; in contrast, only 37% of people with no political interest report their positive turnout. However, we find that the bias against female candidates does not vary across respondents with different levels of political interest (see the appendix for more details).

ideological position. A total of 1,583 respondents completed the conjoint experiment tasks in our survey (a completion rate of 91.3%). A detailed descriptive statistics on our sample are shown in the appendix. Because each of our respondents evaluated ten pairs of candidates, we have data from 31,660 profiles or 15,830 evaluated pairings. This is large enough to estimate the effect of each attribute in the candidate profiles.

The outcome variable of interest in this study is which candidate was chosen by a respondent. The choices are coded as a binary variable, where a value of one indicates that a respondent supported the candidate and zero otherwise. We analyze the data following the statistical approach developed in Hainmueller, Hopkins, and Yamamoto (2014) to estimate non-parametrically what they define as the average marginal component effect (AMCE). To estimate the AMCE of each attribute on the probability that the candidate will be chosen, we employ the "cjoint" package (ver. 2.0.4) developed by Strezhnev et al. (2016). The standard errors are clustered by the respondent to account for the dependence of observations across respondents. In the following sections, we first present the average direct effect of a candidate's sex on voter decisions, including separate examinations for presidential and congressional candidates to test for the gender-office congruency hypothesis. We then present the results that test for heterogeneous treatment effects by including the interactions between candidates' attributes and respondents' characteristics to reveal how bias against female candidates varies among different subpopulations within the electorate to test for the gender-affinity hypothesis. Finally, we explore differences by party to test whether party affiliation moderates any gender bias that exists in the full population.

Effects of Candidate Sex and Gender-Office Congruence

We begin with Figure 2, which shows the relative importance of candidate attributes on electoral support for the full sample of respondents and candidate pairings. The dots denote point estimates for the AMCEs, which indicate the average effect of each attribute on the probability that the candidate will be chosen. The horizontal bars show 95% confidence intervals. Our main interest here is the importance of candidate sex on voter decisions. Because each attribute is dichotomous, the estimated effects can be directly compared to one another. Note that within each category of attributes, one treatment is arbitrarily chosen as the omitted reference category, just as in a regression framework where one category serves as the baseline. For candidate sex, we set male as the baseline.

[Figure 2 about here]

The results of our experiment show that candidate sex is a significant voting heuristic, even under the presence of many other cues about candidates. On average, respondents are 1.3 percentage points less likely to vote for a female candidate. Importantly, because of complete randomization of all attributes, this effect cannot be attributed to other factors such as age, experience, issue priorities, or even personality traits that might differ (in reality or perception) between male and female candidates in real elections. In other words, it seems that voters are biased against female candidates as a baseline preference and not just because of traits inferred when evaluating a female candidate. We show in the appendix that the effect is larger – 2.5 percentage points – when the analysis is limited to opposite-sex pairings that include a male candidate and a female candidate. Relative to some other variables such as political experience and policy positions, the effect of candidate sex on voter decisions appears relatively small in magnitude. However, the magnitude of the gender effect is similar to the penalty faced by

minority candidates and candidates with the lowest approval ratings and thus is likely to matter in a tight race where the winner is determined by a narrow margin.

As explained above, scholars have suggested that while women might be discriminated against in presidential elections, female candidates might face less bias or even be favored in congressional elections. Although the logic of how voters might connect perceived traits of male and female candidates with specific offices is intuitive, the gender-office congruency theory has not been fully tested. To provide some resolution to this question, our experiment presented half of the candidate pairs as seeking the presidency and half as seeking seats in the House of Representatives. Analyzing these two groups separately provides a clean test of this theory. Incidentally, it also provides a check on the verisimilitude of our experiment by revealing whether respondents are taking the task seriously enough to differentiate between offices.

Figure 3 shows the results of our analysis, which indicates the estimated marginal effect of candidate sex by the type of political office being sought. We find a clear and statistically significant difference between the two types of political office ($p < .05$). The overall effect of 1.3 points disadvantage presented earlier was an averaged that masked this difference by office. Figure 3 shows there is no female disadvantage in congressional elections, but voters punish female candidates running for president by 2.4 percentage points ($p < .05$).

[Figure 3 about here]

This finding suggests that female candidates face a greater challenge when they run for executive office than when they run for legislative office, but this is true even after controlling for stereotypes that voters associate with male and female politicians. As a result, the standard gender-office congruency theory does not fully explain why voters have a bias against women

being elected as president.[7] For example, because we randomly varied personal characteristics and experience in office, it is not the case that respondents preferred male candidates in the hypothetical presidential election because they inferred that the men were stronger leaders or more experienced. An additional explanation may be that the public simply has more experience with women in Congress, including even the former Speaker of the House Nancy Pelosi. In contrast, the public must use imagination to anticipate what a female president would do in office (Burden, Ono, and Yamada 2017). Research on the first election of black candidates finds that white voters are initally resistant becaue of the uncertainty and lack of experience with black elected officials (Hajnal 2003). It is plausible that the difference between presidential and congressional elections may be because having no experience of a female president brought some fears and uncertainties to voters about choosing a female candidate in presidential elections.

We further show in the appendix that this result is not necessarily driven by people's attitudes toward Hillary Clinton, who was running for the Democratic presidential nomination at the time when our survey was conducted. It is difficult to test for whether attitudes toward Clinton underlie views about a female president, because those who have bias against a female president are prone to dislike Clinton as well. However, as we show in the appendix, there is little evidence for a "Hillary effect" in our data. Even among those who do not have a negative

[7] It is possible that voters are biased against female candidates only when it comes to the presidency and not for other executive offices such as governor and mayor. Additional experiments will be necessary to pursue these nuances of the gender-office congruency theory.

favarability rating toward Clinton, we still found a tendency that people have a greater bias against female candidates in presidential elections than they do in congressional elections.

Effects of Candidate Sex by Subgroups of Voters

We have so far analyzed the overall effect of candidate sex on voter decisions. While we found a modest negative bias against female candidates, not all voters are likely to punish female candidates in the same manner. To examine the heterogeneity of treatment effects, Figure 4 compares the estimated marginal effects of candidate sex on voter decisions for several subgroups of voters. This figure shows how the disadvantage of a female candidate varies across the respondent's characteristics such as sex, education level, age, social class, region of residence, race/ethnicity, and partisanship.

[Figure 4 about here]

Although treatment effects do not actually differ much across respondent attributes, we do uncover some differences across levels of self-identified social class. Whereas lower class voters tend to punish female candidates, upper class voters do not have any bias against female candidates. Differences by race and ethnicity, region, and age are modest to nonexistent. Our results further indicate that female voters do not vote disproportionately for female candidates at higher rates when other candidate attributes are varied. Instead, the results show that male voters prefer male candidates over female candidates. In short, we find no evidence for the gender affinity effect in the form that is often believed to exist among female voters, but we do find evidence for an opposite affinity among male voters.[8]

[8] Note that we cannot rule out the possibility that the effects for male and female respondents are themselves not statistically significant from one another ($p > .10$).

A more dramatic pattern emerges across voters depending on party identification.[9] While Republicans have a negative bias against female candidates about two percentage points, Democrats do not punish female candidates. This is not especially surprising given the preponderance of women who identify as Democrats and serve as Democrats in elective office, although we find that it holds even when other characteristics of the candidate such as policy positions are held constant via randomization. What may be more surprising is that independents exhibit a larger negative bias against female candidates than do Republicans.[10] The probability that independents support a candidate is 3.2 percentage points lower if that candidate is woman.

This result is consistent with our hypothesis. We conjecture that among voters with partisan affiliations, partisanship acts as a strong force that leaves relatively little room for candidate sex to affect the voting decision. Partisanship is in fact a better diagnostic for how election officials will behave in office than perhaps any other characteristic, so partisan voters rationally focus on that dimension over candidate sex. Independents, in contrast, lack a

[9] We measure party identification using the first of the standard branching questions. That is, "leaners" are not distinguished from other independents. However, we also have a measure of attitude toward each party. Our data suggest that 41.2% of those who identified themselves as independents are truly neutral to both parties; the rest of the self-identified independents (59.8%) have an attitude leaning toward either party, but the tilt is often slight and they are almost equally split between the two parties (28.9% for Republicans and 29.9% for Democrats). We discuss more details about the distribution of leaners among independents in the appendix.

[10] The estimated effect for independents is greater than the one for Republicans by 1.2 percentage points, but the difference between them is not statistically significant ($p > .10$).

predisposition to favor one of the candidates based on party. Without a clear indicator that one of the candidates will act as a faithful agent of their independent voter's interests in office, their bias against female candidates is more readily apparent. In short, partisan labels provide a kind of "insurance" for partisans that guards against the uncertainty that a different kind of officeholder might bring. A candidate's party brings a high level of predictability that allows partisan voters to discount other information. Independents, who lack the security provided by a party affiliation, end up relying more on other factors including candidate sex.

Interestingly, this result conflicts with what respondents say when asked about candidate sex in isolation. For example, a survey conducted in November 2014 asked respondents whether they hoped to see a female elected president in their lifetimes or whether it did not matter to them. A majority of Democrats said they hoped this would happen, and more than one-third of independents did, but fewer than one in five Republicans did.[11] This suggests that Republicans would be most likely to harbor bias against female candidates, or Democrats to harbor bias in favor of them, but this only appears to be true in the abstract when other factors about candidates are absent. Our conjoint experiment shows that in the context of making a decision between two candidates with realistic profiles, candidate sex actually matters most to independents because partisanship does not provide them with a reason in itself to override it. For a voter who identifies with a party, choosing a candidate of the same party provides some "insurance" about what the official would do in office regardless of their sex.

[11] Pew Research Center, "American's Views of Women as Political Leaders Differ by Gender," http://www.pewresearch.org/fact-tank/2016/05/19/americans-views-of-women-as-political-leaders-differ-by-gender/

To explore partisan differences further, Figure 5 presents the estimated marginal effects of candidate sex separately for the two competition contexts—competitions between different-party candidate pairings (Democrat vs. Republican candidates) and competitions between same-party candidate pairings (Democrat vs. Democrat candidates or Republican vs. Republican candidates). These two scenarios mimic the options that voters actually face in general elections and primary elections, respectively. We argue that independents have the greatest bias against female candidates because a candidate's party label cannot work for them to ensure that their views are reflected in politics. If this is the case, the effect of candidate sex on voter decisions should be more determinative among partisan voters (especially among Republicans) in the context of electoral competition where the party label is not a point of differentiation.

The results shown in Figure 5 are consistent with our expectations. When electoral competition is between two candidates from *different* parties, both Democrats and Republicans show no hostility toward female candidates (i.e., the estimated marginal effect of candidate sex for each group is not statistically discernible from zero). In contrast, when electoral competition is between the two candidates running from the *same* party, Republicans show biases against female candidates of 2.8 percentage points, while Democrats remain to have no bias against female candidates.[12] These findings suggest that candidate sex becomes more important for Republicans when candidates cannot be differentiated by a party label; candidate sex does not matter among Democrats regardless of the electoral context. In other words, partisanship helps Republicans override the bias based on candidate sex. This implies that candidate sex is likely to

[12] Democrats actually favor female candidates by 1.2 percentage points, but this estimated effect is not statistically significant at the .10 level.

play a more important role for voters (especially Republicans) in evaluating candidates in primary elections or in nonpartisan elections where the party label—so consequential in general elections—is not a point of differentiation.

[Figure 5 about here]

In summary, the results of our conjoint experiment demonstrate that voters use candidate sex as a voting heuristic even when it is embedded among various other cues about candidates. At the same time, the overall effect of candidate sex on voter decisions is relatively small compared to other candidate attributes such as issue positions and public office experience, and its magnitude is almost the same as the effect of candidate race/ethnicity. In addition, the punishment to female candidates is limited to presidential rather than congressional elections, and appears only among male voters. More importantly, the results further show that the effect of candidate sex varies significantly among voters across party lines, and in particular, that independent rather than Republican voters showing the greatest negative bias against female candidates. We attribute this to the "insurance" that a party label provides to partisan voters and argue that the lack of such relevant information for independents allows their bias against female candidates to emerge. Republicans display bias in nonpartisan elections but appear to overcome the bias when they can differentiate candidates based on the party label.

Conclusion

Even though a majority of the population and of voters in the United States is female, women are sorely underrepresented in Congress and a woman has yet to be elected president. A complete explanation for the underrepresentation of women in elective office is necessarily complex and multifaceted, yet its elements are gradually coming to fruition. In particular, recent research has shown that part of the explanation is that potential female candidates are less likely

to view themselves as qualified, are less willing to endure the demands of campaigning, and are less likely to be recruited than are men in similar circumstances (Kanthak and Woon 2015; Lawless 2012; Lawless and Fox 2005; Sanbonmatsu 2006).

Previous studies have demonstrated that voters view candidates from gendered perspectives. This in itself could lead to the gender inequality in elected office. However, the scholarly literature has not made clear whether voters actually use candidate sex as a voting heuristic. This is partly because various other cues about candidates—such as candidate's party label and even policy positions—are also available to voters. These other cues may overwhelm the effect of candidate sex on voter decisions, particularly in the contemporary era as public resistance to women in public life has declined and party cues have become so powerful.

The design of our study allows for new insight on this aspect of women's representation. It is difficult to evaluate the effect of candidate sex on vote decisions by using actual election results due to the presence of endogeneity problems such as entrance barriers for female candidates. Hence, multiple prior studies have conducted experiments to determine whether a candidate's sex has a direct effect on voting decisions among people by manipulating candidate profiles in campaign advertisements and newspaper articles to make firmer causal inferences. However, those studies test the effects of multiple candidate attributes in separate experiments rather than simultaneously, and the number of varying candidate attributes in each experiment is quite limited. Omitting potentially relevant characteristics is a concern because voters have been shown to infer things about candidates based on their sex. Because the conventional experimental designs cannot fully decompose multiple treatment effects and rule out these inferential mechanisms, we instead employed a conjoint survey experiment. This design enables us to examine the relative importance of candidate sex on vote decisions by randomly varying a

large number of candidate attributes in profiles to rule out endogenous effects, spurious effects, and mechanisms that are distinct from a baseline gender preference.

The results of our study demonstrate that a candidate's sex affects voter decisions even under the presence of many other information cues about candidates. Voters pay attention not only to a candidate's party label and issue positions, but also to the candidate's sex. However, the overall magnitude of the bias against female candidates is relatively small compared to other candidate attributes such as issue positions and public office experience, and its magnitude is almost the same as the effect of candidate race/ethnicity. Moreover, the bias does not occur because women disproportionately support female candidates; rather, the gender-based affinity effect is found only among male voters who prefer male candidates to female candidates. The effect of candidate sex also differs between presidential and congressional elections. However, in an apparently challenge to the gender-office congruency theory, we found that female candidates running for presidential elections face a greater challenge than those running for congressional elections even after isolating the effect of candidate sex as distinct from stereotypes that voters associate with male and female politicians. Thus, the role of gender stereotypes among voters cannot fully explain the difference between the levels of office that candidates are competing for.

Most importantly, our results further showed that the effect of a candidate's sex varies significantly among voters across party lines, and in particular, that independent rather than Republican voters show the greatest negative bias against female candidates. We attribute this to the "insurance" that a party label provides to partisan voters, who can be sure that the party affiliation of the candidate will represent their views in office regardless of the sex of the candidate, and argue that the lack of such relevant information for independents allows their bias against female candidates to emerge. Republicans override their bias against female candidates

when they can differentiate candidates based on the party label. In contrast, independents have no such insurance, and always react more immediately to candidate sex.

Our findings point to at least two intriguing paths for further research about conditions where candidate sex might be more consequential. The first path is to explore election environments where candidate information is less rich. The importance of candidate sex as an informational cue may be different depending on the types of other candidate attributes shown to voters. Indeed, the information cues available to voters differ depending on the context of electoral campaign. The sex of a candidate is usually easy to discern from advertising or from the names listed on the ballot, but policy information might be more elusive, particularly in lower level elections where knowledge about candidates is thinner. A study by Kirkland and Coppock (forthcoming) also uses conjoint experiments and finds some evidence for voter bias against *male* candidates in an environment where voters are given less information, notably the absence of any partisan information. Further research is needed to understand how the office in question and richness of candidate information might shift gender bias back and forth from one setting to another.[13] In addition, there is also a possibility that exposure to candidate attributes related to

[13] The Kirkland and Coppock (forthcoming) study differs from ours in two important ways. First, the authors compare elections with and without party labels, but do not examine elections where both candidates are from the same party. Second, their experiment does not tell respondents what office is being sought. Instead, the experiment varies the previous office held by the candidate, ranging from local offices such as city council to representative in Congress. It is possible that respondents infer what office is being sought by the backgrounds that are presented to them in each candidate pairing.

gender stereotypes activates voters showing a bias against female candidates (see Bauer 2015). As a future extension, we need to systematically examine how the effect of candidate sex changes as voters across variation in the information environment.

The second path is about how voter experiences with female elected officials might themselves change attitudes over time. The number of female representatives is increasing in Congress, especially on the Democratic side of the aisle. Voters often rely on stereotypes in evaluating unfamiliar candidates due to fear and uncertainty associated with them, but those uncertainties tend to dissipate as voters experience more members of underrepresented groups in elective office. Thus, the experience of having female representatives in Congress may have reduced the bias against female candidates among Democrats. Moreover, the presence of female president may change how voters evaluate female candidates in presidential elections afterwards. Researchers might test this possibility by examining whether female candidates are evaluated differently between voters who have any incumbent female representatives before and those who do not have such an experience.

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Table 1. Types of Attributes Varied in Candidate Profiles

Attributes	Values
Person information	
Sex	Male
	Female
Age	36 years old
	44 years old
	52 years old
	60 years old
	68 years old
	76 years old
Race / Ethnicity	White
	Black
	Hispanic
	Asian American
Family	Single (never married)
	Single (divorced)
	Married (no child)
	Married (two children)
Experience in public office	12 years
	8 years
	4 years
	No experience
Salient personal characteristics	Provides strong leadership
	Really cares about people like you
	Honest
	Knowledgeable
	Compassionate
	Intelligent
Party information	
Party affiliation	Democratic Party
	Republican Party

Table 1 (continued). Types of Attributes Varied in Candidate Profiles

Attributes	Values
Issue information	
Policy area of expertise	Foreign policy
	Public safety (crime)
	Economic policy
	Health care
	Education
	Environmental issues
Position on national security	Wants to cut military budget and keep the U.S. out of war
	Wants to maintain strong defense and increase U.S. influence
Position on immigrants	Favors giving citizenship or guest worker status to undocumented immigrants
	Opposes giving citizenship or guest worker status to undocumented immigrants
Position on abortion	Abortion is a private matter (pro-choice)
	Abortion is not a private matter (pro-life)
	No opinion (neutral)
Position on government deficit	Wants to reduce the deficit through tax increase
	Wants to reduce the deficit through spending cuts
	Does not want to reduce the deficit now
Poll information	
Favorability rating among the public	34%
	43%
	52%
	61%
	70%

Note: This table shows the attributes and attribute values that are used to generate the candidate profiles for our conjoint experiment.

Figure 1. Experimental Design (Congressional Election)

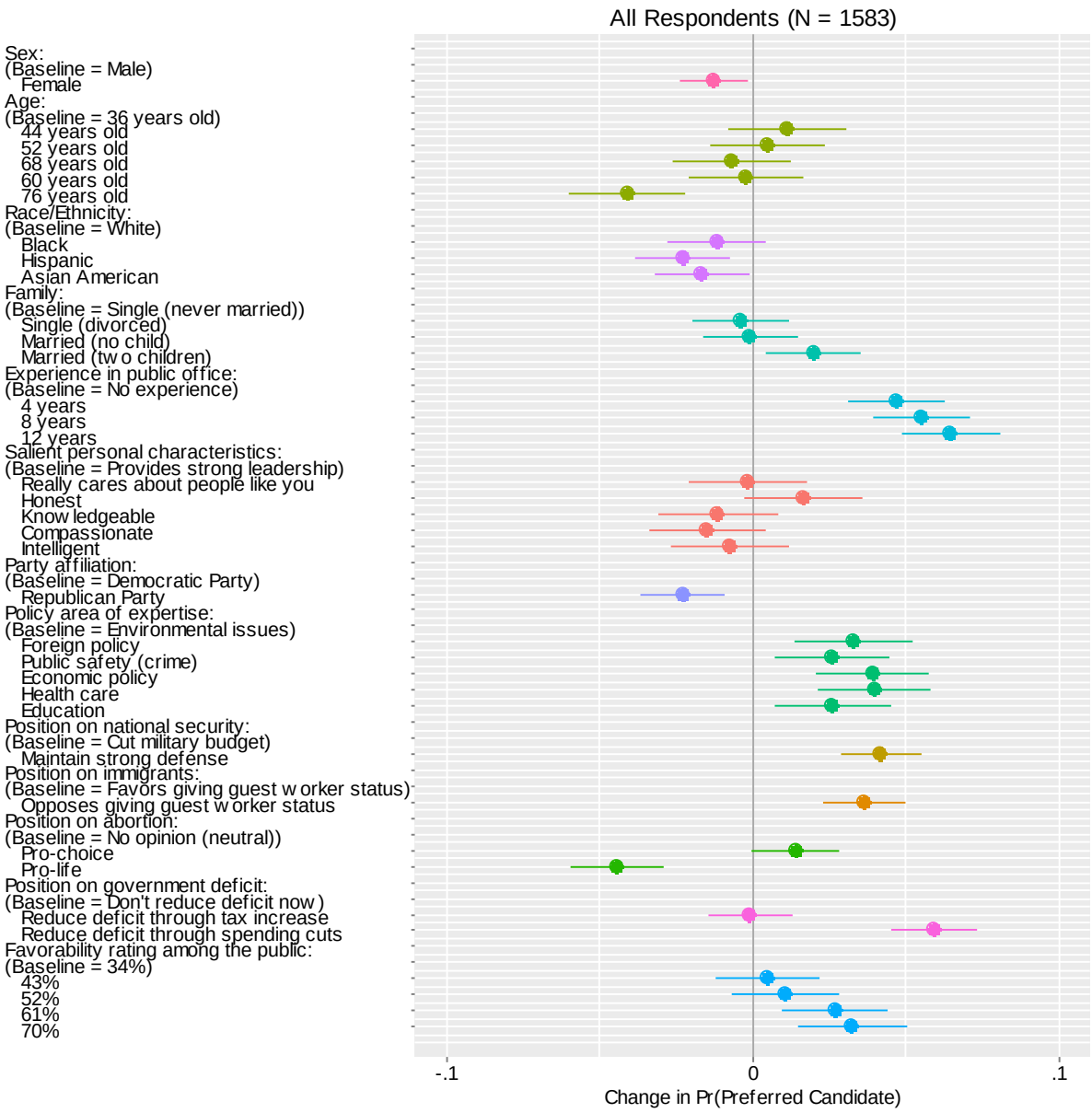
Please carefully review the two potential candidates running for election to the U.S. House of Representatives, detailed below.

	Candidate 1	Candidate 2
Race / Ethnicity	Hispanic	Asian American
Age	52	60
Favorability rating among the public	70%	34%
Position on immigrants	Favors giving citizenship or guest worker satus to undocumented immigrants	Opposes giving citizenship or guest worker status to undocumented immigrants
Party affiliation	Republican Party	Democratic Party
Position on abortion	Abortion is not a private matter (pro-life)	Abortion is a private matter (pro-choice)
Position on government deficit	Wants to reduce the deficit through tax increase	Wants to reduce the deficit through tax increase
Salient personal characteristics	Really cares about people like you	Really cares about people like you
Position on national security	Wants to cut military budget and keep the U.S. out of war	Wants to maintain strong defense and increase U.S. influence
Gender	Female	Female
Policy area of expertise	Education	Foreign policy
Family	Single (divorced)	Married (no child)
Experience in public office	12 years	4 years

If you had to choose between them, which of these candidates would you vote to be a member of the U.S. House of Representatives?

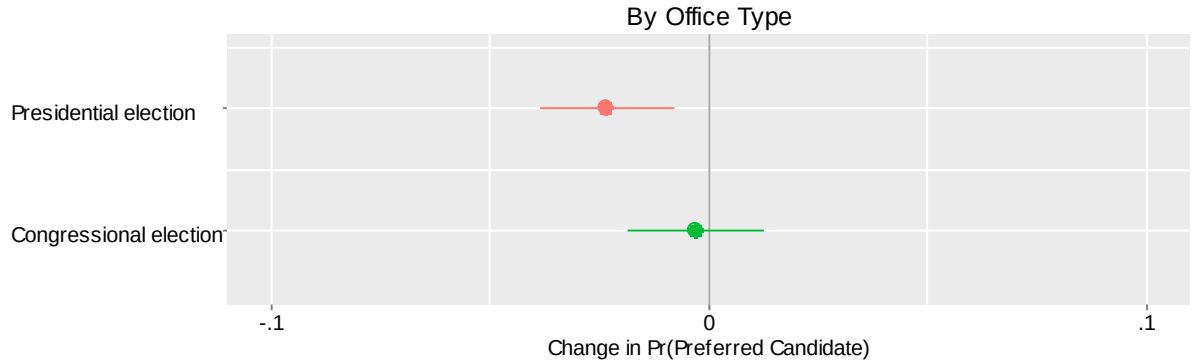
Candidate 1 ○ Candidate 2 ○

Figure 2. Marginal Effect of Candidate Attributes on Voting Decision



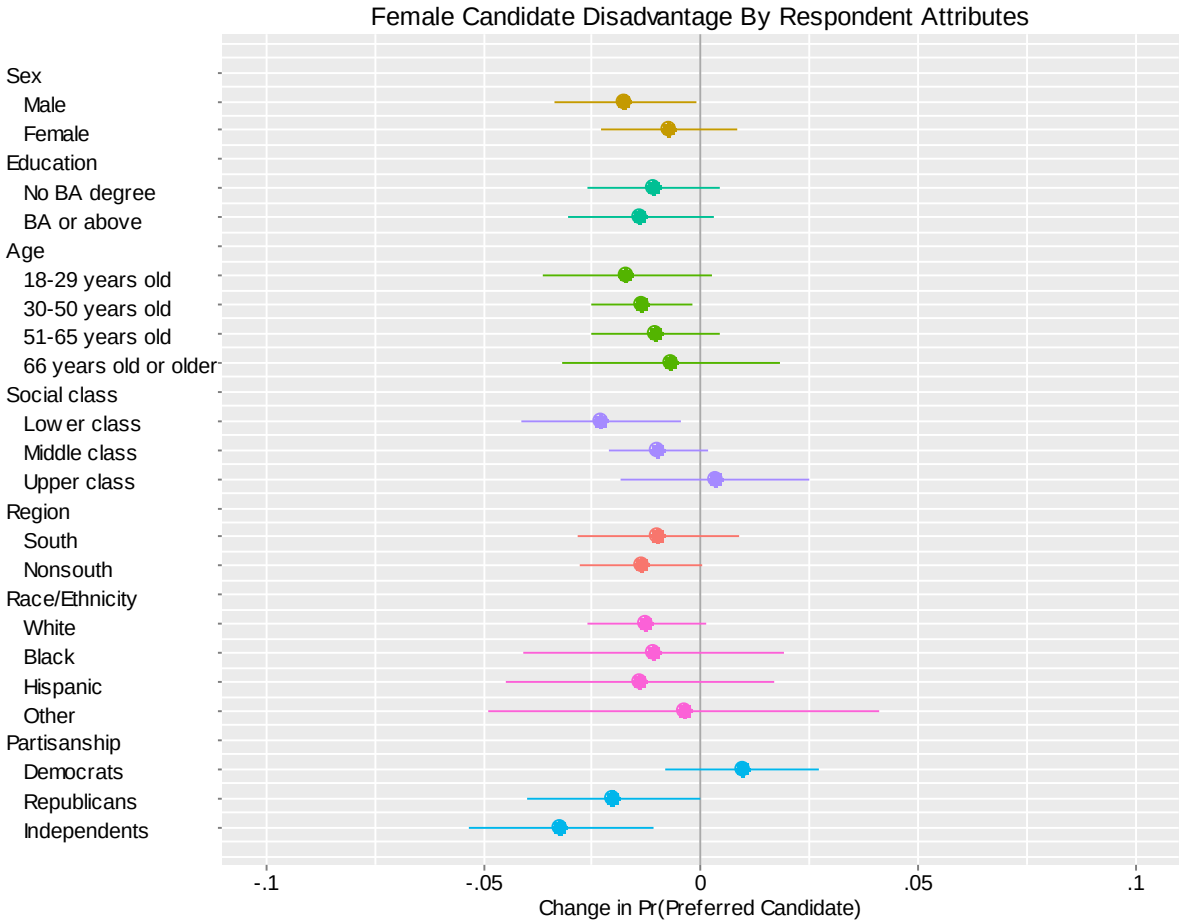
Note: Plots show the estimated effects of the randomly assigned candidate attributes on the probability of being supported by voters. Bars represent 95% confidence intervals.

Figure 3. Marginal Effect of Candidate Sex on Voting Decision by Office Type



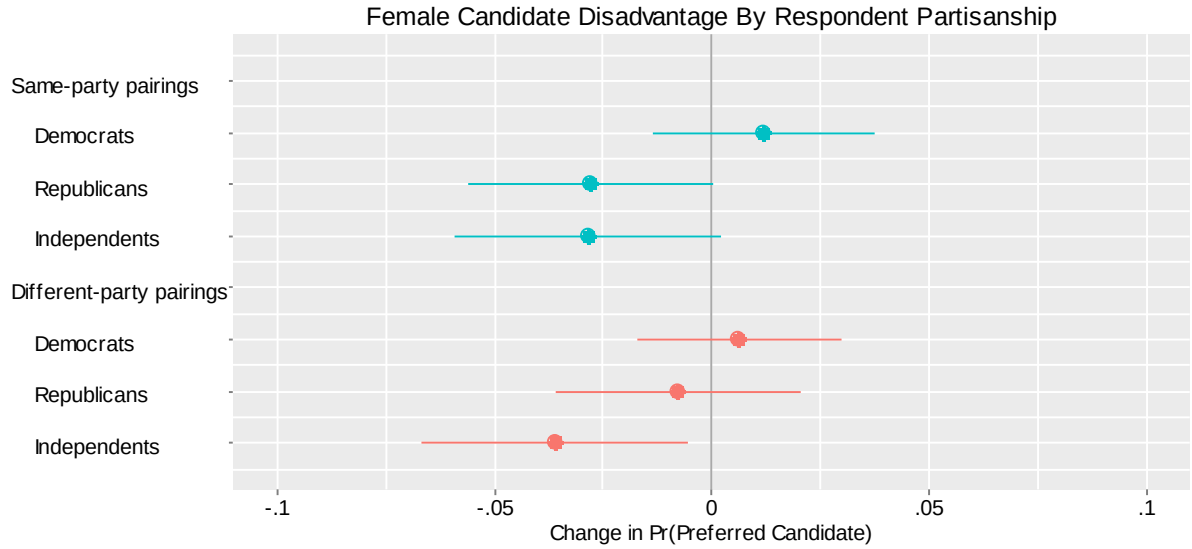
Note: Plots show the estimated effects of the randomly assigned candidate sex (female) on the probability of being supported by voters, conditional on the assumed level of office. Bars represent 95% confidence intervals.

Figure 4. Marginal Effects of Candidate Sex on Voting Decision by Respondent Attributes



Note: Plots show the estimated effects of the randomly assigned candidate sex (female) on the probability of being supported by voters, conditional on voter attributes. Bars represent 95% confidence intervals.

Figure 5. Marginal Effects of Candidate Sex by Respondent Party Identification



Note: Plots show the estimated effects of candidate sex on the probability of being preferred to vote in elections. They are separately estimated by the same-party pairings and different party pairings for the group of respondents who are Democrats, Republicans, and Independents, respectively. Bars represent 95% confidence intervals.

Appendix

The Contingent Effects of Candidate Sex on Voter Choice

The purpose of this appendix is to provide additional information about topics that could not be fully addressed in the manuscript.

1. Sampling Methodology

The sample has been stratified by the region of residence (Northeast, Midwest, South, and West), sex (male and female), race/ethnicity (white, black, Hispanic, Asian, and others), and age groups, based on the 2010 U.S. Census data. In collecting data, we first asked demographic screening questions to 3,152 people in the SSI panel and invited 1,733 people among them according to fixed quotas so that the total sample matched the adult U.S. Census population. A total of 1,583 respondents completed the conjoint experiment tasks in our survey. Detailed descriptive statistics on our sample are shown in Table A1.

Table A1. Sample Descriptive Statistics

	Number	Percentage
Sex		
Male	766	48.4%
Female	817	51.6%
Education level		
No BA degree	888	57.1%
BA degree	666	42.9%
Age group		
18-29 years old	305	19.3%
30-50 years old	678	42.8%
51-65 years old	450	28.4%
66 years old or older	150	9.5%
Social class		
Lower class	481	31.0%
Middle class	812	52.3%
Upper class	261	16.8%
Region		
South	569	35.9%
Nonsouth	1014	64.1%
Race/Ethnicity		
White	1055	66.7%
Black	190	12.0%
Hispanic	226	14.3%
Other	112	7.1%
Partisanship		
Democratic Party	614	41.0%
Republican Party	467	31.2%
Independent	414	27.7%

Note: DK/NA respondents have been excluded.

Table A2 displays how our sample compares to the Census. Each cell reports the deviation between the Census and our sample for a particular group. An example is black females aged 65 and over in the Midwest where the share our sample differs from the Census by just -.10 percentage points. In most cases the deviations are extremely small, always below one percentage point, and are always within the margin of error. The results show that our samples quite accurately reflect the entire U.S. population and weighting would not change the results materially. We also checked to see if the response rate (the ratio of missing data) for our conjoint experiment question varies across groups, and found no much variation that might introduce significant bias into our results.

Table A2. Deviations of Key Demographic Characteristics from U.S. Census

Region	Age	Hispanic		Excluding Hispanic							
				White		Black		Asian		Other	
		Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Northeast	18-24	-0.01	-0.05	-0.35	-0.27	0.04	-0.15	-0.01	0.05	-0.02	0.04
	25-44	0.09	0.35	0.95	0.49	0.23	0.06	0.03	0.07	-0.04	0.08
	45-64	0.17	0.02	0.99	0.27	-0.04	0.09	-0.09	-0.10	0.03	0.09
	65-over	-0.07	-0.11	-0.47	-0.14	-0.10	-0.16	-0.05	-0.06	-0.01	0.05
Midwest	18-24	-0.07	-0.11	-0.47	-0.63	-0.11	0.08	-0.05	-0.04	-0.04	0.02
	25-44	0.05	-0.17	-0.18	0.35	-0.12	0.10	0.06	-0.14	0.06	-0.07
	45-64	-0.09	0.11	0.08	0.89	0.06	0.20	0.12	-0.02	-0.05	0.08
	65-over	-0.03	-0.04	-0.59	-1.14	0.02	-0.10	-0.02	-0.03	0.05	-0.02
South	18-24	0.01	0.02	-0.87	-0.14	0.17	-0.10	-0.07	0.00	0.07	0.13
	25-44	-0.08	-0.22	0.49	0.14	-0.12	0.22	-0.04	-0.01	-0.06	0.18
	45-64	0.09	0.45	-0.06	1.10	-0.09	-0.14	0.17	-0.05	0.03	0.21
	65-over	0.05	-0.21	-0.46	-1.62	-0.06	-0.04	-0.04	-0.06	-0.03	-0.04
West	18-24	0.19	-0.20	-0.36	0.07	-0.02	-0.01	-0.08	-0.13	-0.03	-0.09
	25-44	-0.05	0.40	0.65	0.19	0.05	0.00	0.22	-0.09	0.07	0.07
	45-64	-0.11	-0.06	0.45	0.81	0.07	0.27	-0.02	-0.16	0.00	0.05
	65-over	-0.07	-0.20	-0.11	-0.50	0.07	-0.07	-0.08	0.06	-0.04	-0.05

2. Question Wording

To test the theory of gender-office congruency, we manipulated question wording and asked our respondents to evaluate candidates both for president and for Congress. In our conjoint experiment, we presented a total of ten pairs of candidates, and changed the introductory script shown before asking respondents to review candidate profiles for the first five pairs and for the last five pairs, respectively. We prepared for the two types of introductory script as follows (one is for asking respondents to assume a presidential election, and the other is for asking respondents to assume a congressional election):

Introductory script for a presidential election

Suppose you were asked to choose between two candidates for U.S. president. In the following questions, we will show you five pairs of potential candidates running for the U.S. presidential election. For each pair, please indicate which of the two candidates you would like to vote for.

Introductory script for a congressional election

Now, suppose you were asked to choose between two candidates for U.S. Congress. In the following questions, we will show you five pairs of potential candidates running for the U.S. House of Representatives. For each pair, please indicate which of the two candidates you would like to vote for.

In addition to manipulating the introductory script, for every pair, we presented a pair of candidate profiles with the following question wording so as to remind our respondents that they are evaluating candidates running for either president or Congress:

Question about a presidential election

Please carefully review the two potential candidates, running in the U.S. presidential election, detailed below. If you had to choose between them, which of these candidates would you vote to be U.S. President?

Question about a congressional election

Please carefully review the two potential candidates running for election to the U.S. House of Representatives, detailed below. If you had to choose between them, which of these candidates would you vote to be a member of the U.S. House of Representatives?

3. Effects of Electoral Competition Context

In our conjoint experiment, we ask individual subjects to choose between a pair of candidates after reviewing their profiles. The candidate profiles shown to our subjects are generated randomly from the set of characteristics. Thus, the combination of candidate profiles is set at random and varies across pairs of candidates. For instance, some cases ask subjects to review two candidates competing between different sexes (male vs. female candidates), while others ask subjects to choose between a pair of same-sex candidates (male vs. male candidates or female vs. female candidates). Similarly, some cases ask subjects to evaluate between a pair of candidates running from the same party (Democrat vs. Democrat candidates or Republican vs. Republican candidates), while others ask subjects to evaluate those who are running from different parties (Democrat vs. Republican candidates). This section explores the effects of such different contexts of electoral competition on voter decisions.

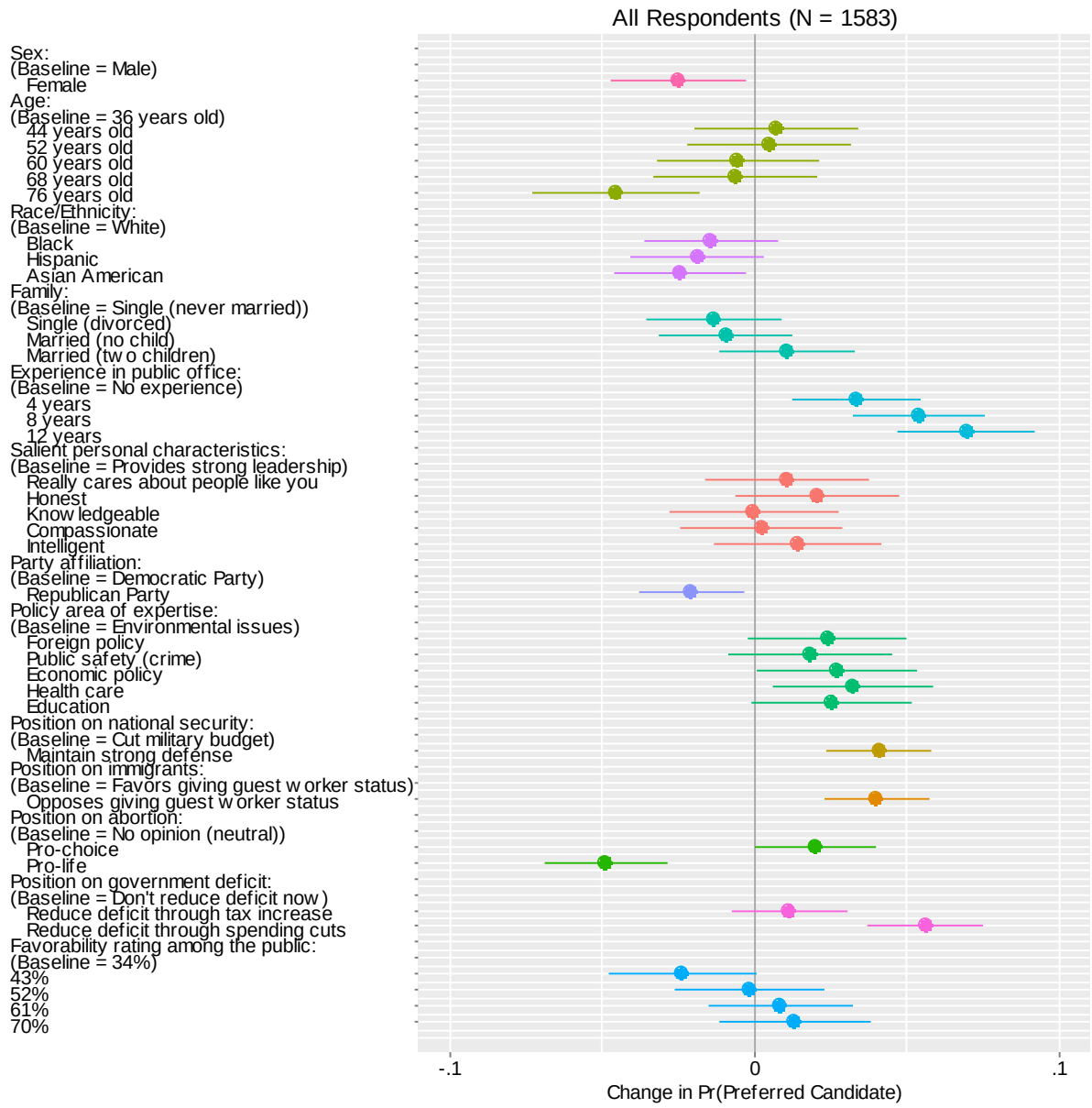
First, we examine the cases when electoral competition is between two candidates with different sexes (male vs. female candidates) to identify the effect of candidate sex on vote choice more precisely. Our original findings based on all the candidate pairings in our dataset shown in

Figure 2 suggest that voters overall are 1.3 percentage points less likely to vote for a female candidate. However, there is a concern that this effect may have been underestimated because this is the average effect including cases that same-sex candidates are competing. Among 15,840 evaluated pairings in our data, 7,930 pairings (50.1%) indeed have the identical sex between the two candidates.[1] Thus, we reanalyze data by eliminating these same-sex pairings to focus exclusively on the cases where a pair of candidates shown to subjects have different sexes.

Figure A1 shows the results based on different-sex candidate parings. The dots denote point estimates for the AMCEs, which indicate the average effect of each attribute on the probability that the candidate will be chosen. The horizontal bars show 95% confidence intervals. The findings suggest that, when the competition for electoral office is held between male and female candidates, voters are 2.5 percentage points less likely to choose a female candidate simply because the candidate is a woman. In short, the bias against female candidates almost doubles under such circumstances. The effects of other candidate attributes remain almost the same as the average ones in Figure 2, but the favorability rating among the public seems to be slightly less important when voters evaluate different-sex candidate pairings.

[1] Whether a pair of candidates have the same sex in their profiles is determined by chance.

Figure A1. Marginal Effect of Candidate Attributes on Voting Decisions (different-sex parings)



Note: Plots show the estimated effects of the randomly assigned candidate attributes on the probability of being supported by voters. Bars represent 95% confidence intervals. Only different-sex candidate pairings (15,820 evaluated profiles) have been included for estimating the results.

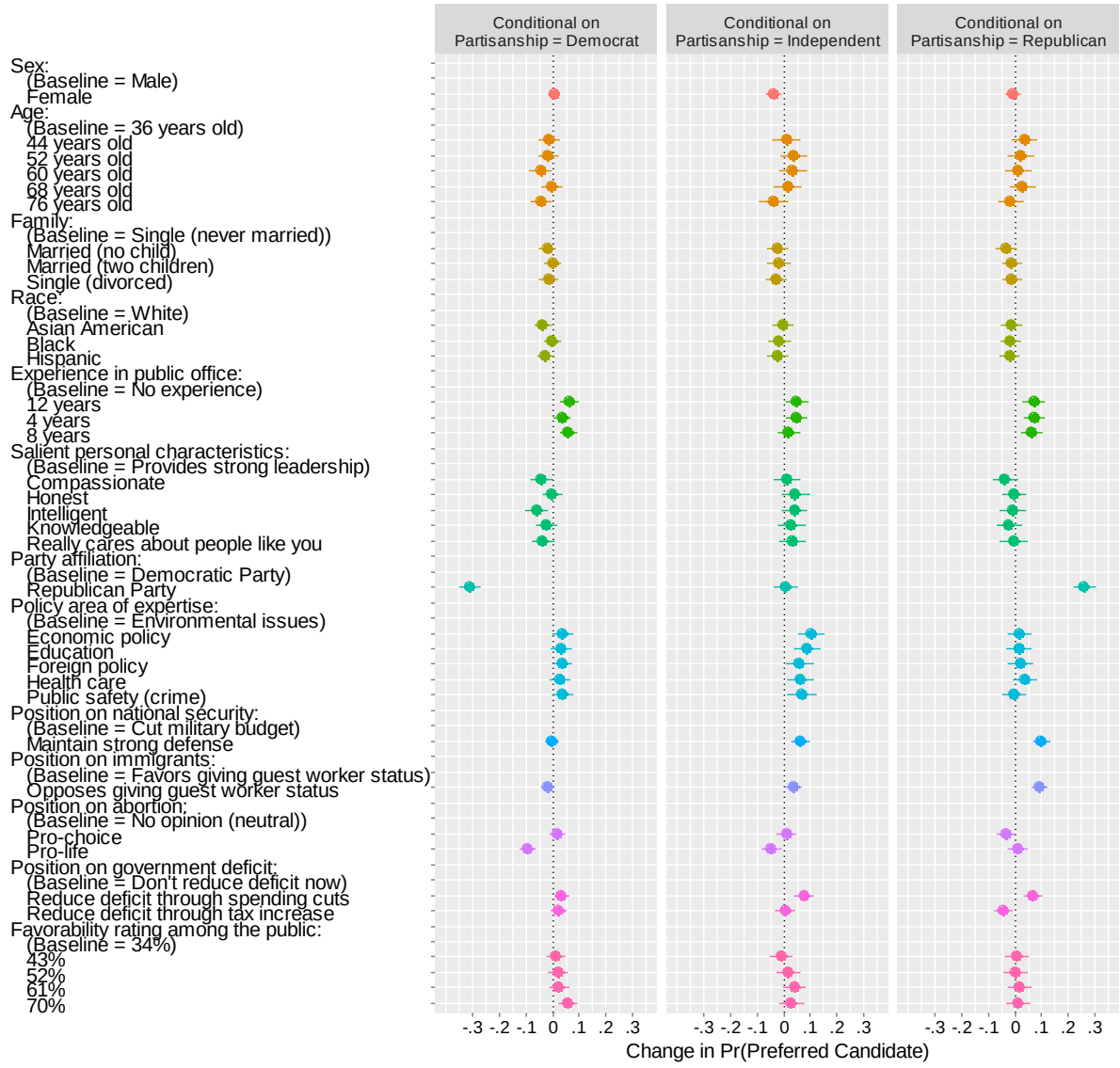
Second, we compare the results of competitions between different-party candidate pairings (Democrat vs. Republican candidates) and same-party candidate parings (Democrat vs. Democrat candidates or Republican vs. Republican candidates).[2] In our data, among 15,840 evaluated pairings, 7,809 pairings (49.3%) have the identical party label between the two candidates, and the rest of them (8,031 pairings) have different party labels between the two candidates.

Figures A2 and A3 illustrate the results for different-party pairings and same-party pairings, respectively. The results show that, when electoral competition is between two candidates from different parties, independents display a substantial negative bias against female candidates of 3.6 percentage points while both Democrats and Republicans show no hostility toward female candidates (0.6 and 0.8 percentage points, respectively).[3] In contrast, when electoral competition is between the two candidates running from the same party, independents and Republicans show biases against female candidates of 2.9 and 2.8 percentage points, respectively, while Democrats remain to have no bias against female candidates (1.2 percentage points *reward* to female candidates, but it is not statistically significant at the 10% level).

[2] Our experiment permitted competition between opposite party candidates and candidates running from the same party. Thus, we are able to examine the difference between these distinct contexts, which roughly approximate general elections and primary elections, respectively.

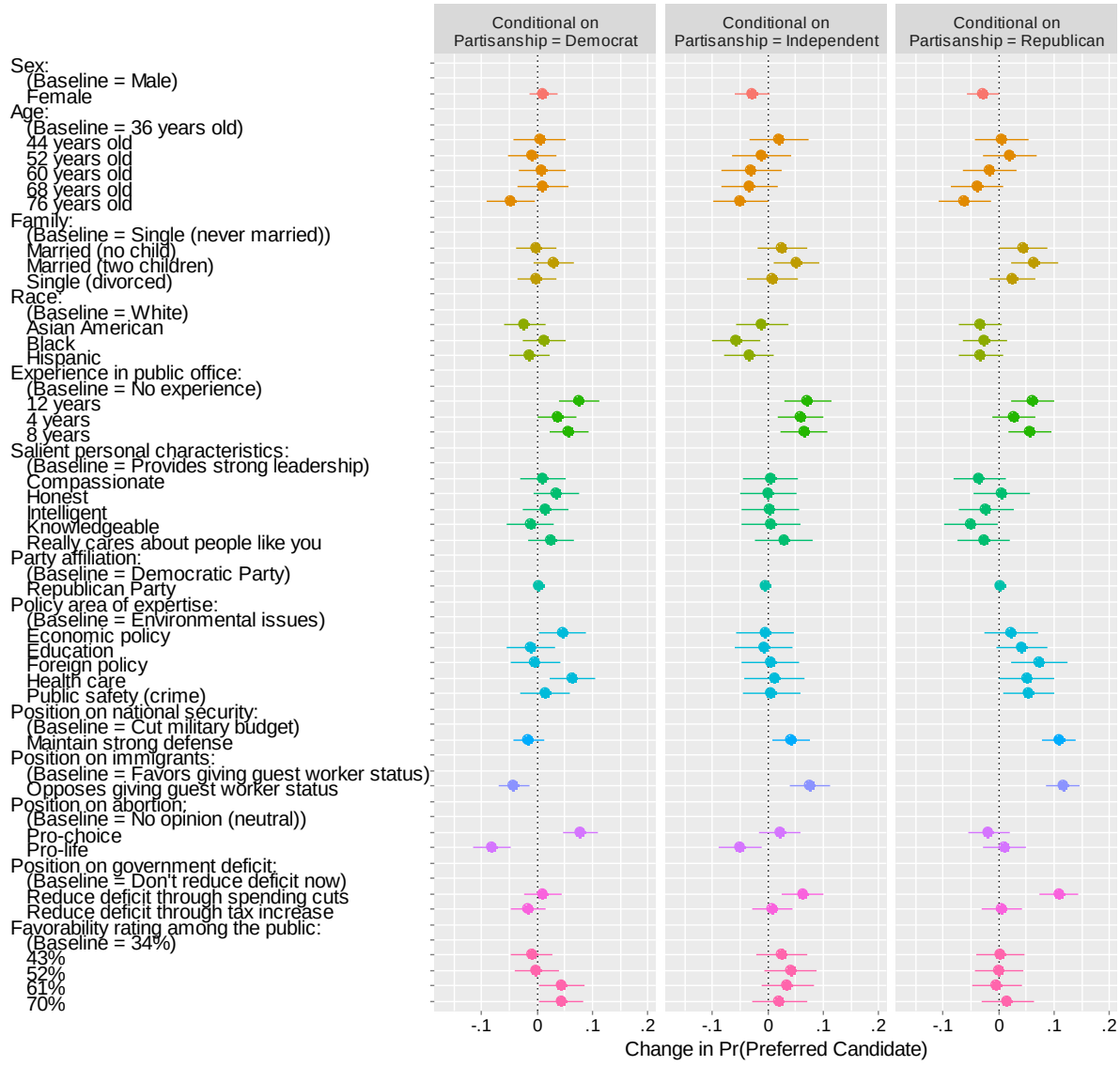
[3] Those partisan voters mostly determine their vote choice by a candidate's party label.

Figure A2. Marginal Effects of Candidate Attributes on Voting Decisions by Respondent Party Identification (different-party parings)



Note: Plots show the estimated effects of the randomly assigned candidate attributes on the probability of being preferred to vote in elections. They are separately estimated for the group of respondents who are Democrats, Independents, and Republicans, respectively. Bars represent 95% confidence intervals. Only different-party candidate pairings (16,062 evaluated profiles) have been included for estimating the results. Note that the range of x axis differs from Figure A3 and other figures because the effect of a candidate's party affiliation is so large among partisan voters relative to the effects of other candidate attributes.

Figure A3. Marginal Effects of Candidate Attributes on Voting Decisions by Respondent Party Identification (same-party parings)



Note: Plots show the estimated effects of the randomly assigned candidate attributes on the probability of being preferred to vote in elections. They are separately estimated for the group of respondents who are Democrats, Independents, and Republicans, respectively. Bars represent 95% confidence intervals. Only same-party candidate pairings (15,618 evaluated profiles) have been included for estimating the results.

4. Party Identification and Attitudes toward Parties

We measure party identification as well as attitudes toward each party using the following questions. The order of the parties in the question has been randomized to minimize bias.

Question about party identification

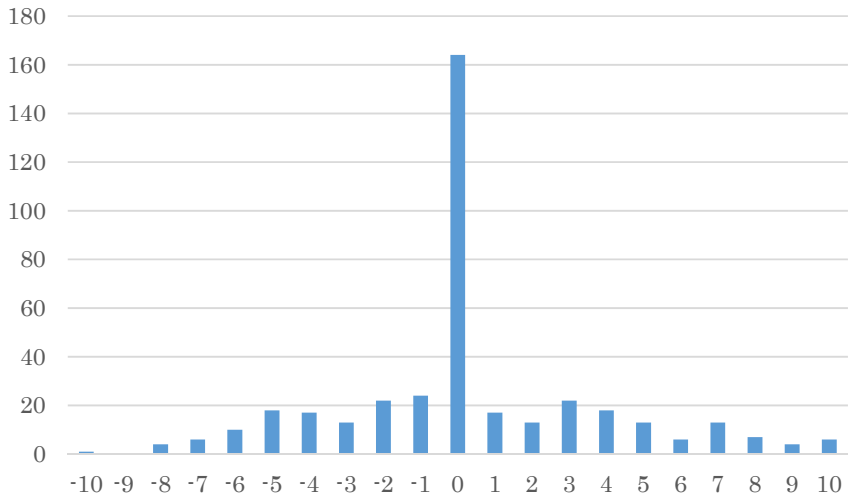
Generally speaking, do you usually think of yourself as a Republican (Democrat), a Democrat (Republican), an Independent, or something else?

Question about attitude toward each party

What do you think about each of the following political parties? Please rate it on a scale from 0 to 10, where 0 means you strongly dislike that party and 10 means you strongly like that party. If you feel you do not know enough about the party, just choose "don't know."

Among independents, we take the difference between their rates for Democratic Party and for Republican Party to see if they have any leaning attitude toward either party. Figure A4 shows the number of independents for each category of relative preference.

Figure A4. Relative party preference among independents

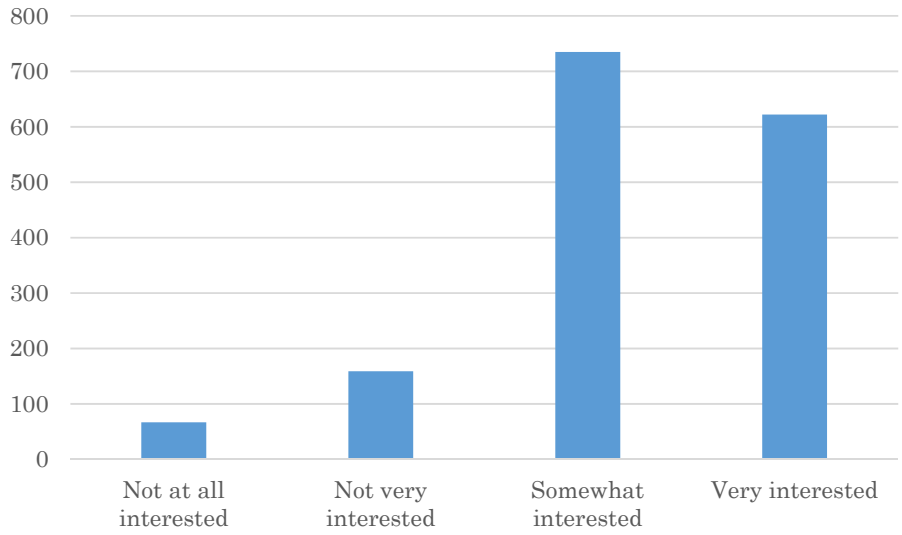


Note: A negative value on the x-axis indicates the respondent is leaning toward the Republican Party, while a positive value indicates the respondent is leaning toward the Democratic Party.

5. Political Interest and Bias against Female Candidates

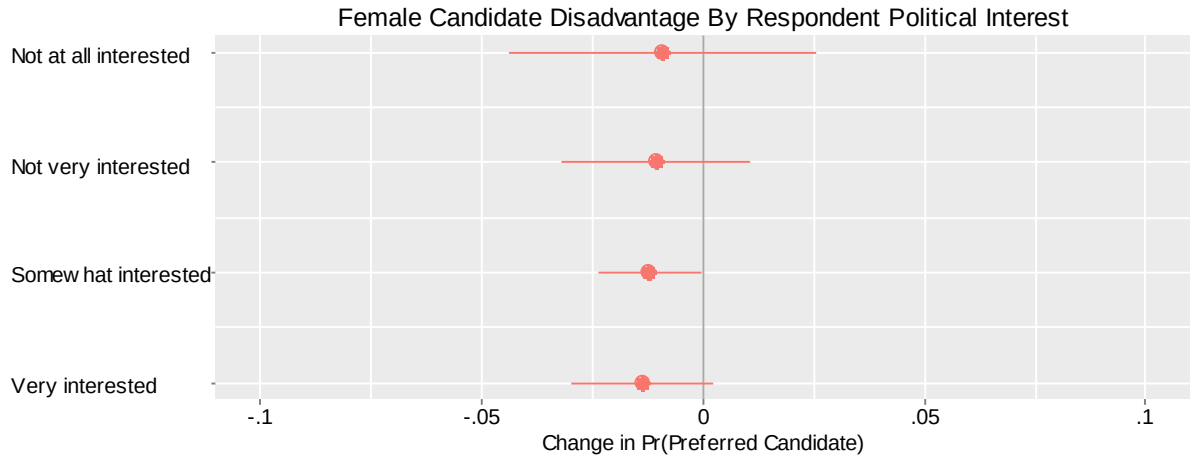
We asked respondents to report the extent to which they are interested in politics on a four-point scale from not at all interested (1) to very interested (4). Figure A5 summarizes the results, which indicate the number of respondents for each category. As shown in this figure, most of our respondents (85.7%) report they are either somewhat or very interested in politics.

Figure A5. Political interest among respondents



To examine whether the bias against female candidates varies depending on the extent to which respondents are interested in politics, we test for heterogeneous treatment effects by including the interaction between candidates' attributes and respondents' political interest. Figure A6 shows the results of voter bias against female candidates. While respondents who are more interested appear to have a slightly larger bias against female candidates, we find no statistically significant difference between more and less interested respondents ($p > .10$). Thus, we believe there is no much difference in their bias against female candidates between actual voters and our samples matched to the adult population.

Figure A6. Marginal Effects of Candidate Sex on Voting Decision by Political Interest



Note: Plots show the estimated effects of the randomly assigned candidate sex (female) on the probability of being supported by voters, conditional on the extent of respondent political interests. Bars represent 95% confidence intervals.

6. Implausible Combinations of Candidate Attributes

The conjoint experiment creates many different combinations of candidate attributes. Almost most combinations will seem plausible to respondents, some candidate profiles will not. For example, political parties represent distinct political positions that make it likely that Republican candidates will have conservative views and Democratic candidates will have liberal positions. In our conjoint experiment, however, candidates are randomly assigned to take a particular position in four policy areas: national security, immigration, abortion, and the federal deficit. For each policy issue, there are both liberal and conservative positions. Hence, some combinations of candidate profiles may appear less credible and cause respondents not to take the exercise seriously.

To examine whether implausible combinations introduce any biases to the results by leading our subjects to make artificial judgments without much cognitive effort, we focus

attention to some of the least plausible combinations of candidate characteristics to see if the results differ in thee settings. In particular, we highlight instances where candidates have contradictory positions from their parties on all of the four policy domains simultaneously. These would be of two types: (1) Democratic candidates who are hawkish on military, hostile towards undocumented immigrants, pro-life, and supportive to cut government spending and (2) Republican candidates who are dovish on military, welcoming to undocumented immigrants, pro-choice, and supportive to tax increase.

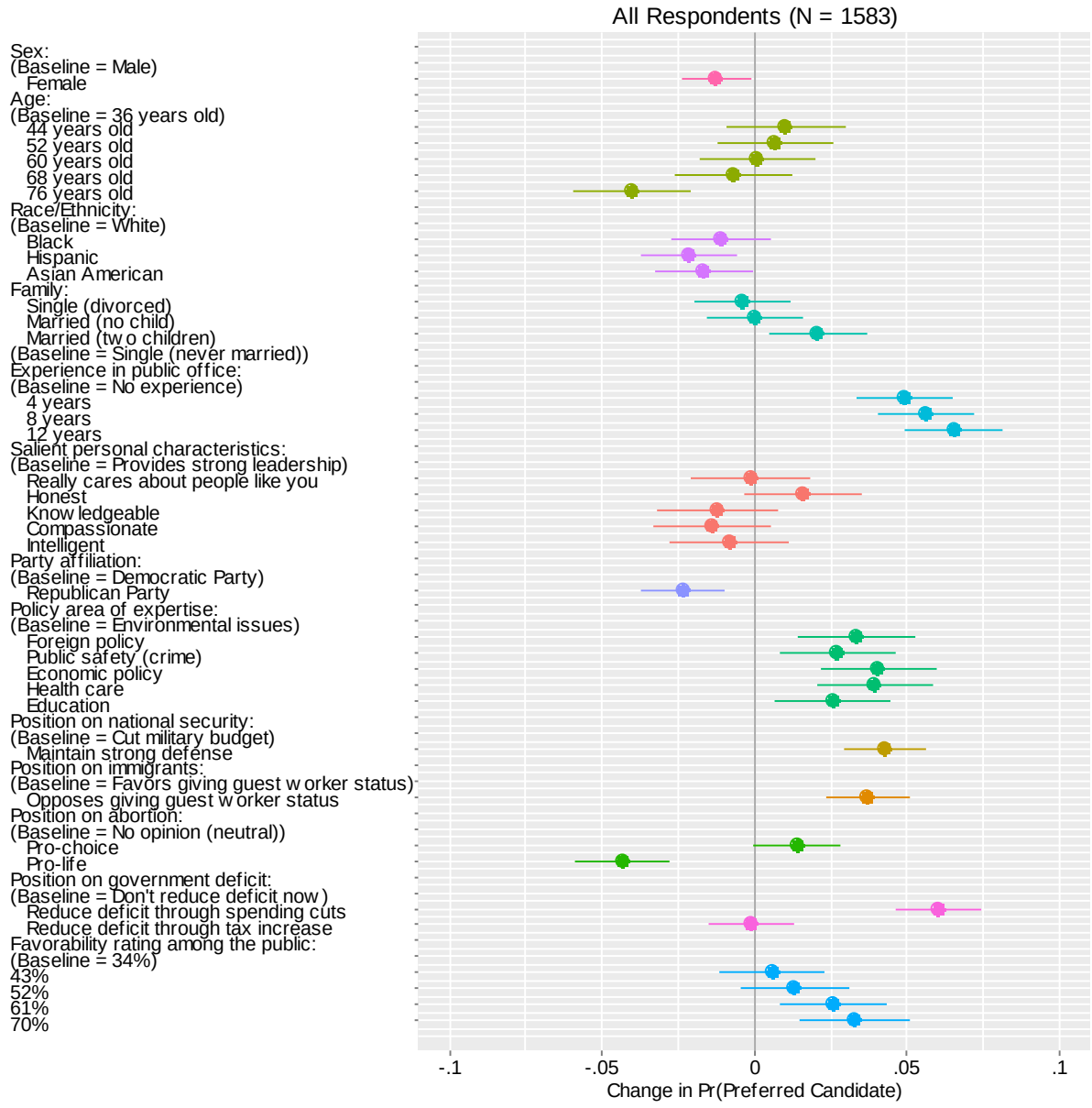
In our data, the number of such implausible candidates is quite small: only 856 out of 15,830 pairs (5.4%) feature at least one candidate of this type. First, we investigate whether our subjects make artificial judgments without paying much cognitive effort when they are exposed to such pairs in our conjoint experiment. We follow other research that uses response times to measure effort exerted by respondents (Berinsky, Margolis, and Sances 2013; Malhotra 2008). In the full sample our subjects on average spent 38.5 seconds to complete each task. While it took only 35.9 seconds for subjects to complete the task when they are asked to choose from a pair of plausible candidates, it took 82.3 seconds to complete the task when they evaluate a pair of candidates with at least one implausible combination. The difference of response time between them is statistically significant ($p < .01$).[4] Thus, we find no evidence to suggest that our subjects

[4] There are some extreme values in our response time data. We suspect that this is because some subjects interrupted their conjoint tasks in our survey. To avoid biases causes by such extreme cases, we reanalyze the data after eliminating observations in top percentile. The results show that subjects who were exposed to implausible candidates still spent 1.7 seconds more time on the evaluation task on average than those without such exposures ($p < .10$).

make artificial judgments to save cognitive effort when they are exposed to candidate pairs with implausible profile combinations. Rather, the failure of a candidate to fit expectations results in a more effortful evaluation.

Second, we exclude pairs with these implausible combinations to see if voters still punish female candidates when they are not exposed to such combinations. Figure A7 shows the results after excluding these pairs. The results remain similar to the initial results shown in Figure 2. Respondents are still less likely to vote for a female candidate, and the negative bias against female candidates is, on average, about 1.2 percentage points.

Figure A7. Marginal Effect of Candidate Attributes on Voting Decision after Excluding Candidate Pairs with Implausible Combinations



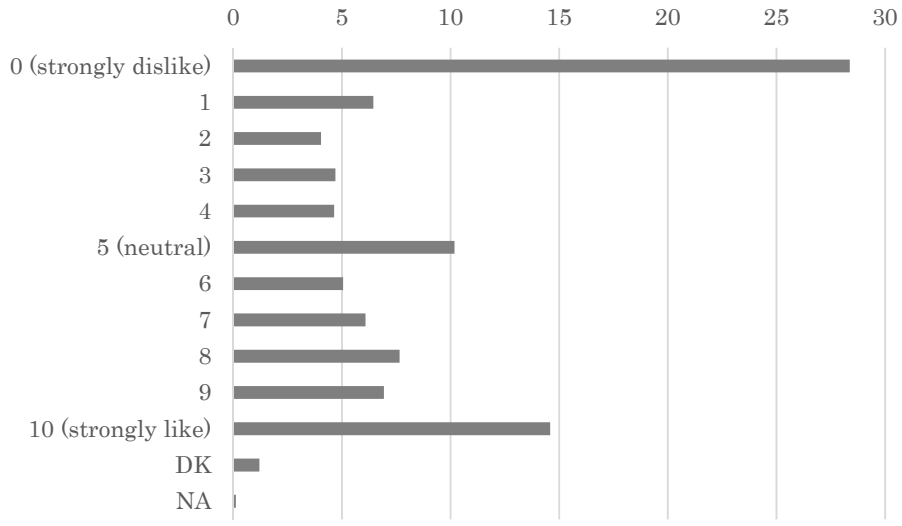
Note: Plots show the estimated effects of the randomly assigned candidate attributes on the probability of being supported by voters. Bars represent 95% confidence intervals.

7. "Hillary Effect" on the Office Congruency

We examine whether attitudes toward Hillary Clinton underlie views about a female president by using a measure of the degree to which respondents like or dislike Clinton. We draw on the following item, which is contained in a battery of questions about various political figures in our survey. The distribution of respondents on their favorability toward Hillary Clinton is shown below the question.

> What do you think about each of the following politicians? Please rate it on a scale from 0 to 10, where 0 means you strongly dislike that politician and 10 means that you strongly like that politician. If you have not heard of, or you feel you do not know enough about the politician, just choose "don't know."

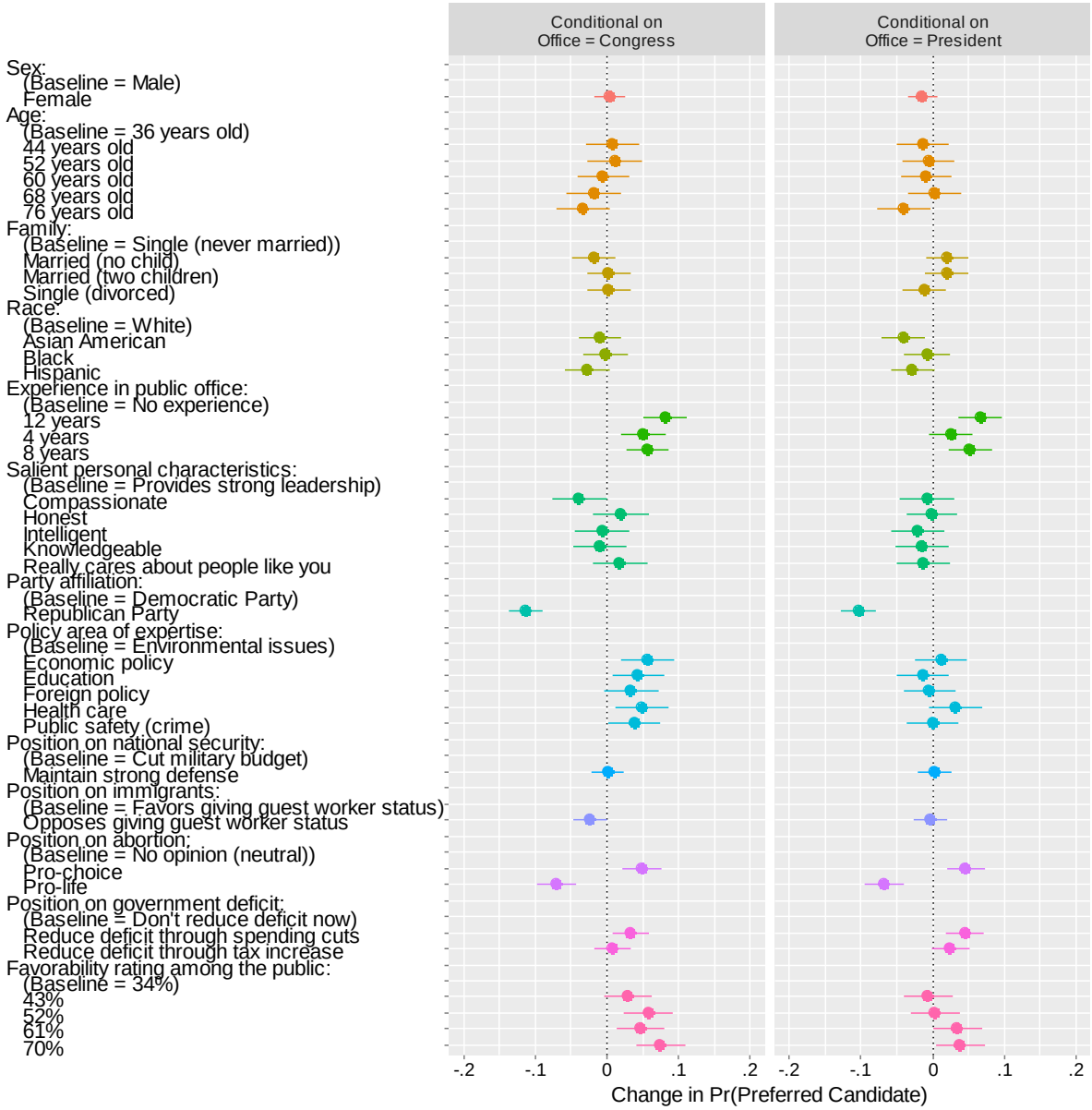
Figure A8. Favorability toward Hillary Clinton



Note: Bars indicate percentages of respondents in each category.

As discussed in the text, we found that voters punish female candidates running for president while they do not in congressional elections. If this is because attitudes toward Hillary Clinton underlie views about a female president, we should not observe such a pattern of attitude change among those who are neutral or like Clinton. Figure A9 shows the results after excluding those who dislike Clinton. We find that attitudes toward Clinton do not necessarily lead respondents to show a greater bias against a female president. Even among the respondents who indicate they are neutral or like Clinton, there still exists a tendency that female candidates face a greater challenge when they run for executive office than when they run for legislative office. The AMCE estimate of a female candidate is -.0140 ($p < .10$) in presidential elections and .0036 in congressional elections, respectively, though the difference between the two is not statistically significant.

Figure A9. Marginal Effect of Candidate Attributes on Voting Decision among Respondents who are Neutral or Like Hillary Clinton (by Office Types)



Note: Plots show the estimated effects of the randomly assigned candidate attributes on the probability of being supported by voters. Bars represent 95% confidence intervals.