

WHO BENEFITS FROM PERCEIVED MASCULINITY?

A VISUAL SURVEY EXPERIMENT

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January 12, 2024

Abstract

As politics has become more visual, there increased a need to understand unexplored heterogeneity in candidate preferences via their visual representation. In this study, I focus on perceived facial masculinity, as a gendered visual cue, to answer whether in the US voter preferences of candidate's gender and race are influenced by candidate's facial masculinity. Adopting a novel visual experiment, I generated photorealistic virtual candidates using a previously not-used tool that allows very detailed manipulation of facial features. Against expectations, I find a general preference for lower facial masculinity in political candidates, primarily shaped by the preferences of self-identified liberal voters. Women, particularly African American women candidates, are worse off when they are perceived to look more masculine than feminine. Furthermore, I show that one mechanism that can explain this finding is the lower degree of perceived attractiveness for more masculine looking candidates, regardless of race and gender. This study adds to the literature by using a novel approach to simulate voters' exposure to candidates and by providing a nuanced understanding of the complex role of facial masculinity under the lens of candidate race and gender.

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†I acknowledge funding from the LSE US Centre Summer Research Grant.

1 Introduction

Researchers have focused extensively on the impact of politicians' words on voting behaviour. However, as our exposure to politicians becomes more visual, understanding how their non-verbal communication might gradually trigger implicit biases among voters is becoming increasingly essential (Bernhard, 2023; López Ortega and Radojevic, 2023; Vecchiato and Munger, 2021). For example, a 2012 Washington Post story describing Barack Obama as "brazenly flaunting his feminine mystique" highlights how a politician's demeanour, in combination with their race and gender, can subtly reinforce gender stereotypes through nonverbal cues (for a detailed discussion see Cooper (2009)).¹ Learning how these cues affect voters is key to understanding voter behaviour and creating more inclusive political communication. Despite studies showing the benefits men can experience by adhering to gender-congruent norms and women by adhering to gender-incongruent norms (Bauer, 2017; Schneider and Bos, 2019), there is still a gap in our knowledge on how gendered non-verbal cues, such as facial characteristics signalling masculinity, influence voters' judgment and how they interact with perceived race and gender of a candidate. Leveraging a state-of-the-art tool released in 2021, I create photorealistic virtual political candidates, to investigate whether candidate's perceived facial masculinity, considering candidate's race and gender, has an impact on voting preferences in the United States. Based on a pre-registered visual conjoint experiment, I find that, on average, voters prefer facial femininity in political candidates.²

Although there is widespread evidence of strategic discrimination against women and minorities (Bateson, 2020; Green, Schaffner, and Luks, 2023), the Obama example offers a nuanced insight into current political dynamics, suggesting that even male politicians may be adapting their presentation in response to a potential change in the gendered preferences within the US political landscape. Recent empirical evidence has uncovered an intriguing pattern in candidate preferences: on a global scale, the exhaustive meta-analysis of candidate

¹https://www.washingtonpost.com/opinions/barack-obama-the-first-female-president/2012/05/14/gIQAViB1PU_story.html

²The hypotheses and primary data analysis in this paper adhere to a pre-analysis plan that was registered before the experiment was conducted: *click here for the anonymised pre-registration plan*.

choice experiments conducted by Schwarz and Coppock (2021) reveals that women candidates perform slightly better than men on average. However, this “pro-women” preference might disguise some heterogeneity. Studies have shown that the preference for women varies based on candidates’ marital status (Clayton et al., 2020; Teele, Kalla, and Rosenbluth, 2018), race (Lemi and Brown, 2020; Mosier and Pietri, 2021; Schneider and Bos, 2011), whether elections are gender-stereotype congruent elections (Anzia and Bernhard, 2022), the partisanship of voters (Bernhard, 2022; Koch, 2000), their non-verbal physical traits such as height (Bernhard, 2023), voice (Cinar and Kibris, 2023; Klofstad, 2016), perceived attractiveness (Chiao, Bowman, and Gill, 2008) as well as their facial features (Carpinella et al., 2016) such as having a gender-congruent facial traits (Hehman et al., 2014; Rhodes, Hickford, and Jeffery, 2000). Yet, with an increase in voter exposure to candidates via visual platforms (Carpinella and Johnson, 2016), such as social media and television debates, the question of whether there is still a relatively unexamined heterogeneity in the preference of visuals for women and non-white candidates has become increasingly important.

The visual interaction with a candidate could increase voters’ reliance on familiar signals, hurting the diversity of representation voters receive. As a result, physiological cues like perceived facial masculinity and femininity might play a role beyond simple categorization in triggering gender stereotypes. The study by López Ortega and Radojevic (2023) reveals that using visual cues rather than textual labels in the candidate selection process appears to significantly amplify the discriminatory preferences. They show that, with visual cues, the preference for women candidates and especially non-white women lessens notably. Understanding facial masculinity and femininity as an endogenous and continuous component could help to explain why discriminatory biases may rise in response to political candidates’ visual representations. This non-manipulative gendered signal perceived via faces has the potential to dissect the literature’s findings on the preferences of the binary gender of politicians.

In this study, I show that visual signals related to physical appearance influence voter preferences for specific candidates. On average, I find that when visual cues are present, voters prefer men candidates over women candidates; however, regardless of race or binary

gender, I find that voters prefer candidates with less facial masculinity. Therefore, my study shows that facial masculinity can be one of the factors that could explain voters' preferences for either women or men candidates when we move away from binary gender classifications to understand the underlying cues voters could perceive from candidates' faces. This finding also indicates that when exhibited visually, women candidates can still experience a disadvantage compared to men, however, having more facial femininity serves as a mediating gendered cue. When I confine my focus to African American candidates, I find that African American women candidates benefit more from possessing more facial femininity than their co-racial male counterparts. One plausible explanation for this finding is that voters tend to perceive candidates of any racial background or women with facial features that align more closely with stereotypical masculine traits as being less attractive. The results also indicate that the preference for facial femininity in political candidates is primarily influenced by self-identified liberal voters, whereas conservative voters do not differ significantly in their preference for facial masculinity based on the candidate's race.

According to preconceptions based on facial features, facial masculinity, a heuristic that is difficult to change on a daily basis, may favour or disadvantage politicians and inclusive political representation. Researchers have looked at the relationship between facial characteristics, including facial masculinity to some extent, and voting behaviour, exploring how these visual cues may affect how we evaluate and choose political leaders (for a review, see [Carpinella and Johnson \(2016\)](#)). Nonetheless, how facial masculinity, as a continuous gendered signal, functions differently at the intersection of race and gender in political decision-making still offers room for our understanding of visual cues in representation. Furthermore, the method I used for creating computer-generated faces opens up possibilities for future research on visual elements by providing very complicated tools for experimentally modifying visual features in a systematic way.

2 Visual perception and voter choice

The proliferation of visual representations of political candidates across various media platforms has elevated the significance of non-verbal cues in shaping voter perceptions. With the increasing reliance on televised broadcasts (Sapiro et al., 2011; Bauer and Santia, 2021), debates (Boussalis et al., 2021), social media (Boussalis, Coan, and Holman, N.d.; Vecchiato and Munger, 2021), and campaign websites (Druckman, Kifer, and Parkin, 2007) for candidate information, voters often resort to observable physical attributes to inform their impressions and decision-making (Carpinella and Johnson, 2016). Extensive research has underscored the strong link between these visual cues and candidates' electoral success, emphasizing the heuristic role of facial features in facilitating rapid information processing (Todorov et al., 2005; Olivola and Todorov, 2010; Klofstad, 2017). This paper delves into the influence of facial masculinity as a prominent visual characteristic on voter preferences, seeking to understand how its impact on candidate evaluations varies depending on the candidate's gender and race in the United States.

2.1 Facial masculinity: is it sexually dimorphic?

Disentangling gender category information from indicators of facial femininity and masculinity is important. Evidence suggests that gender classification based solely on facial features can be inaccurate (Walker and Wänke, 2017). Extra information about the person's facial styling, like hairstyle and jewellery, is often required to determine if they are a man or a woman. While high levels of facial masculinity are generally associated with the male gender, it is not necessarily true that all men display high levels of facial masculinity. In addition, it is possible for women to exhibit varying degrees of facial masculinity, which can be attributed to a range of factors, including genetic predisposition, hormonal fluctuations, and environmental factors. Elevated testosterone levels are associated with masculine facial traits such as a stronger jaw and brow and narrower eyes (Pound, Penton-Voak, and Surridge, 2009) and dominance, risk-taking, and status-seeking (Spisak et al., 2012). Oestrogen, on

the other hand, is associated with feminine facial traits, giving women wider eyes and fuller lips and makes them more caring and kind (Taylor et al., 2000; Thornhill and MØller, 1997).

While the level of facial masculinity might be physiologically gendered and men hormonally have a higher chance of portraying more masculine features, social role theory and gendered socialisation theory suggest that men's and women's historical occupation of societal roles (e.g., men as leaders and breadwinners, women as caretakers and nurturers) has led to widespread beliefs about their internal characteristics being consistent with those required to perform these roles (Eagly, 1987; Eagly and Wood, 2016; Bos et al., 2022).

The notion of leadership being gendered is a prevalent stereotype, especially in the realm of politics (Eagly and Karau, 2002; Lombard, Azpeitia, and Cheryan, 2021). However, perception of masculinity as a gendered continuous cue might hide some heterogeneity in candidate preferences. Oliver and Conroy (2018) find that regardless of gender, higher perceived masculinity improves the likelihood of being recruited for political office. In another study, Chan et al. (2021) show that voters and lobbyists perceive masculine politicians as being harder to control. Rosenwasser and Dean (2016, p. 82) find that men were more likely than women to win the presidency and that voters viewed masculine-categorised tasks as being comparatively more significant than women's. Research has shown that this might be due to the association of masculinity with traits such as strength (Rosenberg et al., 1986; Johns and Shephard, 2007), competence (Oh, Buck, and Todorov, 2019; Olivola and Todorov, 2010), and dominance (Wen et al., 2020). Consequently, political candidates who exhibit facial characteristics and conduct that are construed as masculine would be more likely to be perceived as competent leaders and enjoy a higher probability of securing electoral victory (Cooper, 2009; Carpinella and Johnson, 2016) (also for heterogeneous effects see Carpinella et al. (2016) and Bernhard (2022)). In particular, I aim to test the following hypothesis:

Hypothesis 1. *Voters are more likely to choose a candidate with more masculine features.*

The gendered correlations between facial signals and personality factors may explain why these characteristics have distinct effects on election outcomes for men and women. Women

politicians often portray a masculine image of competence while projecting a feminine image of beauty (Bauer, 2017). Incongruent with neither masculine nor feminine norms, research reveals that voter expectations of women candidates are uncertain. Voters do not regard women candidates as feminine (Bauer, 2015b,a; Dolan, 2014), but they also do not instantly identify them with desirable leadership characteristics such as experience and expertise (Schneider and Bos, 2014). This disparity in gender classification and perceived masculinity is a result of the flexible nature of masculinity and femininity.

2.2 Accounting for candidate race

In accordance with the principles of social role theory and the leadership prototype within the US, the perception of an individual's leadership capabilities is expected to be linked to their electability. Leaders are deemed highly efficient and desirable when they exhibit traits that are stereotypically associated with males or white individuals. According to prior studies, there exists a perception that women and African Americans are less likely to possess robust leadership qualities in comparison to their male and white counterparts (Schneider and Bos, 2011; Ditonto, Hamilton, and Redlawsk, 2014). Experimental research in this area has been limited (for a recent investigation, see Mosier and Pietri (2021)), despite the fact that theoretical consideration of the interplay between these two factors in the creation of political stereotypes has garnered substantial attention (Gay and Tate, 1998; Brown and Gershon, 2016; Ditonto, Stalsburg, and Andersen, 2010; Holman and Schneider, 2016).

Research on minority politicians shows that racial biases can affect election outcomes, with minority politicians receiving consistently lower approval ratings than their white counterparts. According to Weaver (2012), there is a higher probability that voters will associate unfavourable political stereotypes with politicians who possess more distinct African American physical characteristics compared to those who have more Caucasian features. This is due to the fact that negative racial stereotypes are more strongly linked to individuals who belong to the outgroup and exhibit darker skin tones and more Afrocentric traits. Visalvanich

(2016) unveils racial competency stereotypes in political candidates, showing how white individuals tend to view minorities as less qualified and unfit for politics. As Schneider and Bos (2011) point out, African American politicians face stereotypes that they are less competent than their white counterparts in terms of intelligence, influence, eloquence, and leadership ability. In addition to that, they reveal that African Americans are more direct and emotionally intense but not as manipulative as other groups. Furthermore, if non-African-Americans believe that African-American leaders are putting the interests of their own racial group ahead of their own constituents' interests, they may be less likely to support those leaders (Schneider and Bos, 2011).

The notion that minority politicians may be perceived as less viable candidates compared to their non-minority counterparts has the potential to influence public attitudes towards them. Although African American candidates are often perceived as more compassionate, capable, and motivated to serve the interests of marginalised communities than their white counterparts (Sigelman et al., 1995), there are concerns among voters regarding the competence of African American politicians on issues that are not directly related to race (Brown and Gershon, 2016; Gordon, Miller, and Harrison, 2006). These concerns might cause voters to negatively evaluate African American politicians when they have less information of these politicians expertise or their issue priorities, hence paving the way for voters to rely on the stereotypes. The perception of a candidate that is deemed excessively masculine may potentially elicit racial stereotypes towards candidates belonging to minority groups (Cooper, 2009). Therefore, the presence of facial masculinity may have a negative impact on the electoral success of African American politicians. Thus, I anticipate that African American candidates who possess more masculine physical attributes than their same-race opponents will encounter greater electoral obstacles:

Hypothesis 2. *Voters are less likely to choose African American candidates with more masculine features. However, they are more likely to choose Caucasian candidates with more masculine features.*

Within the political context of the US, it is imperative to acknowledge the intersection of gendered signals and racial classifications. Little et al. (2007) showed that voters tend to perceive white men candidates as more masculine than non-white or women candidates, regardless of their actual facial features. According to the study by Carpinella et al. (2015), male faces elicited categorizations as either Asian or African American for racially ambiguous targets, monoracial targets, and actual facial pictures while female faces elicited categorizations as white. Sigelman et al. (1995) argued that there exists a perception that individuals of African American and Latino descent are deemed incapable of effectively addressing significant policy concerns.

Based on prior studies highlighting the intersectional discrimination faced by African American women, I expect that the impact of facial masculinity on electoral results will be complex. African American women have frequently confronted political marginalisation, either by integrating with larger Black or women's groups or by overcoming stereotypes depicting them as unfeminine, dominant, and excessively assertive (King, 1973; Clayton and Stallings, 2000; McClain, Carter, and Brady, 2005). Successful African American women, especially those who pursue political careers, are typically perceived as distinct from the stereotypical African American woman (Brown and Lemi, 2021; Carew, 2012). Following, it is anticipated that the perceptions of African American women politicians will be shaped by both racial and gender stereotypes in an interactive manner (Ditonto, Stalsburg, and Andersen, 2010).

While the decision to run for political office may serve as an indicator of the capabilities of African American women, it may also exacerbate negative emotional stereotypes and lead to perceptions of diminished qualifications. As per the double jeopardy theory, African American women are perceived to possess the lowest levels of leadership capabilities compared to other gender and racial groups (Berdahl and Moore, 2006; Mosier and Pietri, 2021). There is a perception that African American women exhibit more masculine traits than their Caucasian counterparts (Goff, Thomas, and Jackson, 2008). In accordance with the expected behaviour, they may face fewer negative consequences for engaging in dominant behaviour (Livingston,

[Rosette, and Washington, 2012; Rosette et al., 2016](#)), whereas Caucasian women candidates may be punished for this type of behaviour because it would be viewed as unexpected. Consequently, I expect that the impact of masculine traits will vary between African American women politicians and their men counterparts. This is due to the fact that African American women in politics face not only the stereotype of being masculine but also the stereotype of incompetence. As a result, it can be inferred that African American women encounter supplementary hindrances owing to their dual marginalised statuses as both women and ethnic minorities.

Hypothesis 3. *Voters are more likely to choose African American men with fewer masculine features followed by African American women with fewer masculine features compared to their more masculine counterparts.*

2.3 Heterogeneous candidate preferences by ideology

Previous studies have shed light on the varied positions held by Republicans and Democrats when it comes to the link between political ideology and gendered views. According to [Carpinella and Johnson \(2016\)](#), Republicans tend to support conventional gender norms, placing emphasis on feminine characteristics in women. Conversely, Democrats tend to adopt more progressive gender roles, exhibiting a less strict adherence to established societal standards. The phenomenon of divergence also encompasses facial characteristics, as examined by [Laustsen and Petersen \(2016\)](#) in their study on the influence of facial dominance, which pertains to a masculine and dominant appearance. Notable is the finding that conservative voters have a favourable reaction to facial dominance, which is associated with greater electoral success and communication effectiveness. On the other hand, liberal voters demonstrate lower levels of support for politicians who exhibit facial dominance. This interaction between facial signals and political inclination emphasises how intricately linked gendered perceptions and ideological preferences are.

The partisan signals from the facial cues varies in the interaction of candidate gender

and masculinity and femininity. According to [Carpinella and Johnson \(2013\)](#) study, women politicians who exhibited more feminine traits were more accurately identified as Republicans, while those who exhibited less feminine traits were more accurately identified as Democrats. Specifically, higher levels of facial femininity were associated with political conservatism. [Bernhard \(2022\)](#) find that politicians who were described as feminine were evaluated more favourably by Democrats, liberals, and women from all parties as opposed to Republicans, conservatives and voters for Donald Trump. The literature paves the way for me to explore the heterogeneous effects by voters' ideology and test the following hypothesis:

Hypothesis 4. *The effect of being perceived as more masculine on the likelihood of being elected are greater for Conservative voters than Liberal voters.*

According to the existing literature, individuals who identify as political liberals tend to exhibit a higher level of dedication towards promoting diversity and racial equality in comparison to those who identify as political conservatives ([Bernhard, 2023](#); [Crowder-Meyer et al., 2020](#)). Under conditions of low cognitive load, individuals who are committed to diversity are more inclined to choose African American candidates over Caucasian candidates ([Crowder-Meyer et al., 2020](#)). In the context of both race and gender, the dual identity of African American women candidates holds intriguing implications. This distinctive identity frequently aligns them with progressive and Democratic viewpoints ([Schneider and Bos, 2011](#); [Koch, 2000](#)). This perception may also arise due to historical associations between African American women and progressive social movements. Additionally, the underrepresentation of African American women in conservative political circles further reinforces this alignment with liberal ideologies.³ This concept proposes that the combination of being an African American woman candidate has an accumulative impact on how voters perceive the candidate's ideology and party affiliation ([Ditonto, Stalsburg, and Andersen, 2010](#)). This perception is influenced by the intersectionality of their race and gender, which shapes voters'

³47 Black women from 21 states have served in Congress since Shirley Chisholm (D-NY) became the first elected Black woman to Congress in 1968. The House had 45 Black women (44 Democrats, 1 Republican) while the Senate had 2 (both Democrats). From 2015 through 2019, Mia Love was the only Black Republican woman in Congress (Center for American Women and Politics, 2021).

expectations and assumptions about their policy positions. Therefore, even without explicit party affiliation information, these cues can lead to varying levels of support from voters across the ideological spectrum.

3 Empirical Strategy

To study facial masculinity and its interaction with a candidate's race and gender, I ran a visual conjoint survey in which respondents were visually assigned these three candidate characteristics at random. Respondents were required to choose between two fictitious candidate photographs. The novelty of this study lies in its use of state-of-the-art software to generate realistic hypothetical candidate photos and randomise photo attributes, as well as its examination of the intersection of candidate race and gender in the US.

3.1 Visual Conjoint

In order to elucidate the influence of physiological and demographic characteristics on candidate assessment, it is necessary to incorporate various preference dimensions within the research design of this study. Individuals who participate in the electoral process do not depend on a solitary factor when assessing a potential political representative. In addition, the voters take into account the candidate's demographic characteristics and most of the times for uninformed voters, the appearance of the candidates. According to existing literature, the conjoint survey experiments can be effective in evaluating the causal relationship between various attributes and hypothetical choices ([Druckman et al., 2019](#); [Hainmueller and Kern, 2008](#); [Hainmueller, Hopkins, and Yamamoto, 2014](#); [Hobolt and Rodon, 2020](#)).

The use of visuality within conjoint analysis is a well-established practise in the fields of marketing and product design ([Green and Srinivasan, 1990](#); [Dominique-Ferreira, Rial Bou-beta, and Varela Mallou, 2012](#); [Sylcott, Orsborn, and Cagan, 2016](#); [Birenboim et al., 2019](#)). Although conjoint experiments became highly adopted in political science research to study

candidate preferences⁴, the use of visuals are becoming recently important in candidate choice experiments (Abrajano, Elmendorf, and Quinn, 2018; Vecchiato and Munger, 2021; Bernhard, 2023; López Ortega and Radojevic, 2023; McClean and Ono, 2023).

In a standard conjoint analysis, participants are provided with a set of randomly generated candidate profiles that consist of a list of attributes. They are then instructed to select or rank their preferred options based on their personal preferences. This particular design is suboptimal for the purpose of representing the current interaction of politicians with voters, which is mainly through social media and television (Vecchiato and Munger, 2021). As a significant portion of voters' experience evaluating a candidate is reliant on visual cues, it became more crucial to incorporate this aspect to realistically represent the mode of a voter's assessment of a candidate. Focusing on how candidate's height influence voter preferences, Bernhard (2023) generated a visual debate environment where the two candidates' heights were randomly assigned. Her design imitated the way in which voters come across with politicians close to election times, i.e. on television standing next to each other. Abrajano, Elmendorf, and Quinn (2018) find in their study that the treatment mode effects exhibit variations in conjoint designs. Specifically, they observed that the conjoint designs that incorporate ethnically identifiable photos of political candidates have a significantly greater impact compared to the conjoint designs that rely solely on labels to indicate the candidate's ethnicity. López Ortega and Radojevic (2023) also demonstrate that visual cues elicit more discriminatory preferences than a textual conjoint design. Vecchiato and Munger (2021), in their candidate choice experiment, generated social media profiles for hypothetical candidates in which they randomly assigned each attribute of the candidate profile visually. Based on their argument that visually randomising candidate attributes enhances ecological validity compared to conventional conjoint designs, my study's design adopts creating hypothetical candidate images through the random allocation of three attributes: gender, race, and degree of facial masculinity.

⁴There is an extensive list of studies that conducted conjoint experiments to study candidate preferences, the following are some references from the literature: Hainmueller and Kern (2008); Hainmueller, Hopkins, and Yamamoto (2014); Franchino and Zucchini (2015); Kirkland and Coppock (2018); Doherty, Dowling, and Miller (2019); Horiuchi, Smith, and Yamamoto (2020).

In the contemporary political environment, the evaluation of candidates incorporates an assessment that includes visual impressions. With the arrival of social media and television platforms, voters engage in verbal and nonverbal communication with political candidates. Using candidate photographs in assessing voter preferences is a highly realistic method, reflecting the candidates' genuine ability to establish meaningful connections with their constituents. As I delve into this context, it becomes clear that evaluating political figures involves a complex interaction between their verbal and visual representation.

3.2 Study Design

Participants are administered three choice tasks, wherein they are presented with two visually presented candidate profiles for each task. Each candidate is defined by three attributes with two levels in each: Race, Gender, and Degree of Facial Masculinity (Table 1). In order to address the potential impact of unobserved variables in candidate photographs, a set of 24 candidates was generated, consisting of three candidates for each potential profile while trying to keep other observational traits constant, e.g. age and facial hair. The choice task was, “Now, imagine you are asked to vote for one of the political candidates running for the political office below. Who would you vote for?” The experiment deliberately refrained from providing any cues regarding the political party affiliation of the candidates in order to eliminate the influence of partisanship. This kind of decision task is designed to be very similar to the non-partisan elections in the US where the jurisdiction holding the election prohibits any declaration of political party allegiance, affiliation, or affinity. [Kirkland and Coppock \(2018\)](#) also show that the presence or absence of political labels makes no difference with respect to race and gender, in a conjoint survey experiment.

The experiment was fielded in February 2023 and involved the recruitment of 1014 individuals who are citizens of the United States. Cloud Research Connect platform was set to distribute the survey and collect relevant data.⁵ When compared to the overall population of

⁵The experiment was granted Ethics approval (REC ref.90881) in compliance with the Ethics regulations of the London School of Economics. The approval letter is presented in Appendix Section A.8.

the United States, the Cloud Research sample is, on average, younger, more educated, and more liberal. The sample information can be found in Table A.1 in the Appendix.

Table 1: Attributes

Degree of facial masculinity	Race	Gender
Low facial masculinity ¹	White ¹	Male ¹
High facial masculinity	Black	Female

¹ Reference category

3.3 Experimental Stimuli

The candidate profiles that have been presented exhibit differences from the existing body of political science literature. Rather than presenting the subjects with written lists of candidate profiles, the participants were exposed to two computer-generated political candidate photos, which varied randomly in each attribute. This was facilitated by the use of a recently launched software, MetaHumans.⁶ This software is a user-friendly tool that enables the manipulation of various facial features, ultimately resulting in the creation of high-quality and realistic human images. It also enables the user to modify the levels of various attributes, such as gender, race, cheekbone prominence, jaw size, eye size along with very fine grained visual manipulations. To my knowledge, I am first to use the Metahumans tool in a candidate choice experiment to create hypothetical candidates.

The process of masculinizing both male and female faces was carried out in five stages, as outlined in Mitteroecker et al. (2015), applied to a set of computer-generated human faces. The proposed modifications include: i) increasing the width of the face by augmenting the inter-orbital distance; ii) widening the nasal region; iii) reducing the fullness of the lips; iv) augmenting the lower facial region, specifically the lower jaw area; and v) decreasing the size of the eyes. Prior to the actual experimentation, the stimuli utilised in the study underwent

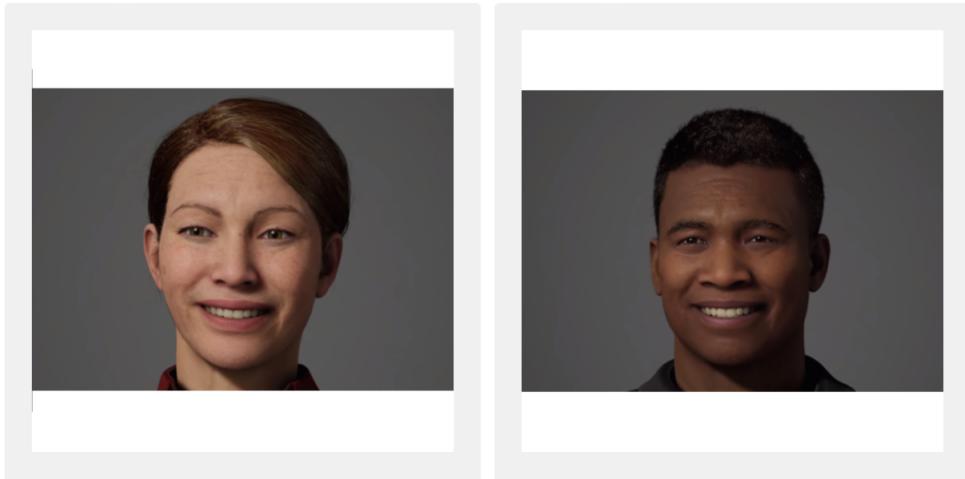
⁶The software package comprises of MetaHuman Creator, an online application that is available at no cost and facilitates the rapid creation of fully rigged photorealistic virtual human beings. <https://www.unrealengine.com/en-US/metahuman>

a preliminary testing phase with a limited sample size to authenticate the experimental manipulations. Five hypothetical candidates were generated for each combination of gender and race. During the validation test, the participants were instructed to rank the computer-generated faces in order of perceived level of facial masculinity, from the most masculine to the least masculine (Figure A.3 in the Appendix presents a screenshot of a validation task.). For the purpose of mitigating potential bias stemming from unobserved characteristics of individual candidates, the actual experiment utilised the top three faces with the highest validation scores for each combination of gender and race.

Figure 1: Screenshot of a choice task

Now, imagine you are asked to vote for one of the political candidates running for the political office below. Who would you vote for?

Please click the edge of the picture (light grey area) to select. If you want to enlarge the pictures, please click on the picture.



(a) Note: The image presented on the left is an example of a feminised Caucasian woman candidate, the image on the right is an example of a masculinised African American man candidate.

3.4 Manipulation check

Table 2 presents the results of the manipulation check conducted to examine whether the masculinisation of the facial features, as per the methodology proposed by Mitteroecker et al. (2015), on MetaHumans are perceived as expected by the participants. On a scale from 0 to 10, respondents were asked to assess the perceived masculinity of each candidate in response to a question designed to detect whether the manipulation worked. The scale measuring perceived masculinity was subsequently transformed into a binary indicator to facilitate the interpretation of Table 2. The first column of Table 2 displays the results for all participants, indicating a 10 percentage points increase in the probability of attributing a more masculine rating to a candidate whose facial features were manipulated to appear more masculine, in contrast to a hypothetical candidate whose facial features were manipulated to appear less masculine. The second and third columns of the table were analysed independently with regards to women and men candidates. The results indicate that the respondents perceived a higher level of manipulation of masculinity in women candidates compared to men candidates. Despite the factors outlined in above sections that contribute to the general perception of men candidates as more masculine, the manipulation of facial masculinity in men candidates resulted in a significant increase of 5 percentage points in perceived masculinity compared to facially feminised men candidates.

	All candidates	Women candidates	Men candidates
(Intercept)	0.50*** (0.01)	0.22*** (0.02)	0.79*** (0.02)
Masculinized candidate face	0.10*** (0.02)	0.15*** (0.02)	0.05** (0.02)
R ²	0.01	0.03	0.00
Adj. R ²	0.01	0.03	0.00
Num. obs.	6084	3040	3044
N Clusters	1014	1002	1005

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$

Table 2: Manipulation check for the level of facial masculinity (Dependent variable: 0: perceived feminine, 1: perceived masculine)

3.5 Analysis

I organise the data so that for each respondent, it contains as dummy variables the descriptive characteristics of the selected and viewed profiles. To analyse the main dependent variable, candidate choice, I calculated the Average Marginal Component Effect (AMCE) and Average Marginal Component Interaction Effect (AMCIE) following the literature ([Hainmueller, Hopkins, and Yamamoto, 2014](#); [Kirkland and Coppock, 2018](#)). Since, each participant completed multiple choice tasks, standard errors were clustered by participants. The details for this analysis can be found in Appendix Section [3.5](#).

I also follow [Leeper, Hobolt, and Tilley \(2020\)](#) and use their R package ‘cregg’ to estimate the AMCEs in a principled manner with every subject decision scenario serving as the unit of analysis while accounting for clustered standard errors by respondents. The cregg package also enables the implementation of survey weights, which I used to depict the descriptive distribution of the US population based on the 2020 wave of the American National Election Studies (ANES).⁷ In an effort to identify the effects by subgroups, I provide related results that estimate the difference in marginal means (MM), which is particularly relevant for making causal claims about the differential treatment effects of attributes on subgroups ([Leeper, Hobolt, and Tilley, 2020](#)).

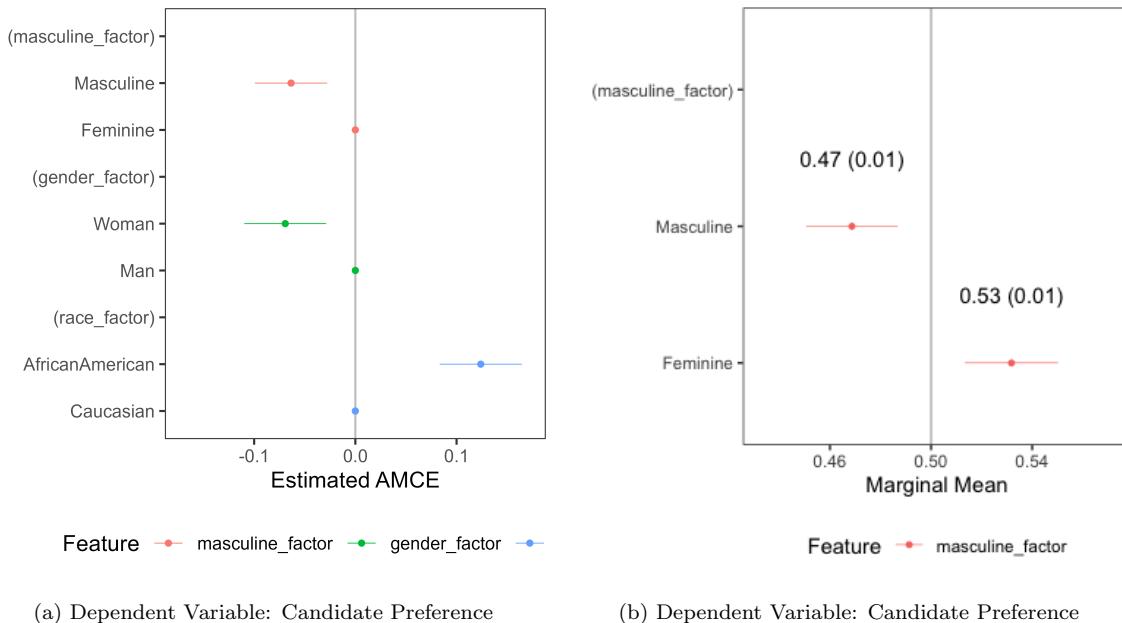
4 Results

The experiment’s outcomes are visually presented in Figure [2](#), featuring both AMCEs for all the attributes (Figure [2a](#)) and MMs for facial masculinity (Figure [2b](#)). I find that respondents exhibited a negative response to heightened facial masculinity with a margin of 6.3 percentage points (pp). In addition, respondents, on average, preferred men candidates over women candidates by 6.9pp. Women respondents did not show a significant preference between women and men candidates, this negative effect is mainly driven by male voters (as presented

⁷The sample characteristics of the Cloud Research platform and ANES representative sample are presented in Table [A.1](#) in the Appendix.

in Figure A.5b). The results also highlight that African American candidates, on average, are preferred more than Caucasian counterparts with 12.3 pp. African-American respondents and younger respondents are the primary sources of this effect (see Figure A.5a and A.5c). The effect of facial masculinity indicate the opposite of what was predicted for masculinity in H1, with significantly higher preference for candidates with lower level of facial masculinity. Even though respondents, on average, evaluated women candidates worse than men, the negative effect on facial masculinity shows a potential explanation of the findings in recent literature (Schwarz and Coppock, 2021); voters when presented in text might prefer women more because they might envision a more feminine looking women candidate. As shown in López Ortega and Radojevic (2023), visual cues can bring forth discrimination as they assign greater importance to social categories such as gender. Although respondents show a negative preference for women candidates, they still prefer more femininity in facial traits.

Figure 2: Average marginal component effect (AMCE) and marginal means (MM)



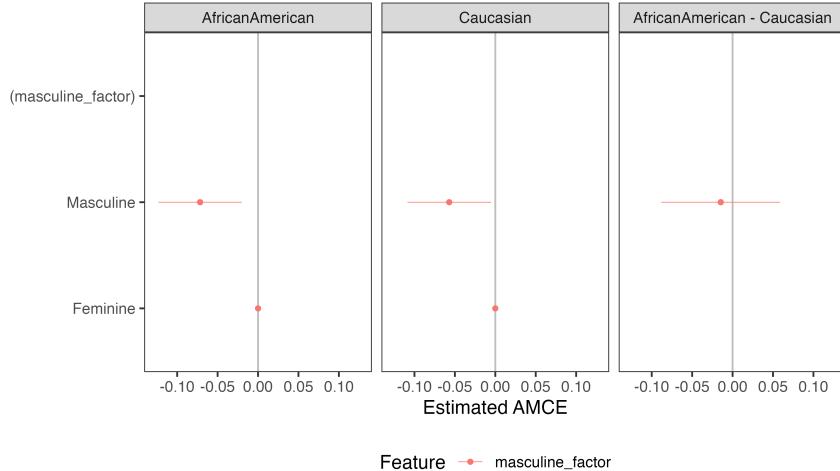
The present analysis shifts attention towards the interaction between candidate race and facial masculinity to test H2. Figure 3a displays the interaction effects. As claimed in hypothesis H2, there exists a preference for African American candidates with feminised facial

features over candidates who exhibit a higher degree of facial masculinity. The preference for facial masculinity when evaluating African American candidates results in a 7.1 percentage point difference in favour of candidates with lower facial masculinity. However, H₂ is only partially supported. Facial masculinity had a statistically significant negative impact on Caucasian candidates, albeit smaller than anticipated (5.7 percentage points), with a significance level of $p < 0.01$. The statistical analysis conducted to assess differences in effect sizes, presented in the third column in Figure 3a, indicates that the change in the probability of selecting a profile based on varying levels of facial masculinity, in comparison to the reference point of low facial masculinity, does not exhibit a significant variation based on the race of the profile. This suggests that the impact of facial masculinity on profile selection is consistent across different racial backgrounds.

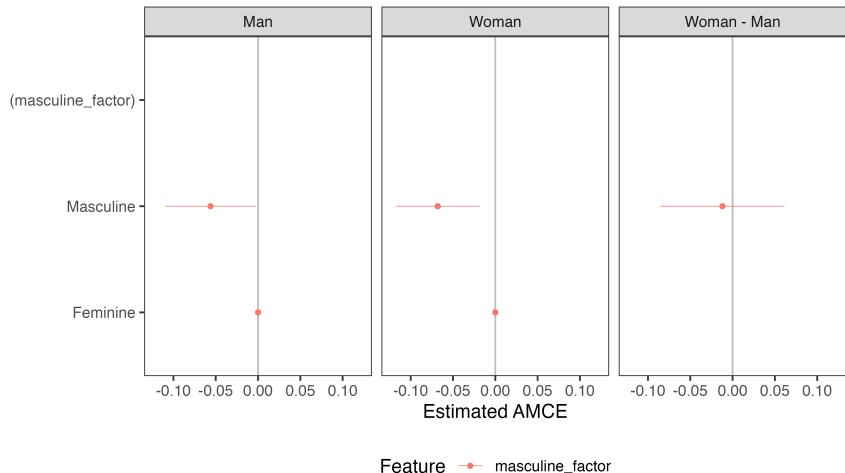
Regarding candidate gender and facial masculinity's interaction, the experimental results show a very similar pattern. Figure 3b shows that both men and women candidates experience a disadvantage when they have a higher facial masculinity level. Facial masculinity level plays a mediating role in for the preference for women candidate. As previously discussed, although voters, on average, have a negative preference for women, they are evaluated similarly to men when they have lower facial masculinity.

Next, in order to test the hypothesis regarding race and gender, H₃, it was necessary to narrow the focus exclusively to African American candidates. The dataset was filtered to include solely observations of African American candidates and subsequently analysed to investigate the potential impact of gender and facial masculinity. The results of this analysis, as presented in Figure 4a indicate that exhibiting heightened levels of facial masculinity had an adverse impact on the selection of African American men and women candidates. Although, African American women candidates exhibiting greater levels of facial masculinity were significantly less preferred compared to their women counterparts displaying more feminine facial features (10.4 pp, $p < 0.05$). Therefore, the hypothesis regarding the relationship between race and gender, as denoted by H₃, is only partially supported.

Figure 3: Average component interaction effects (AMCIE)



(a) Dependent Variable: Candidate Preference

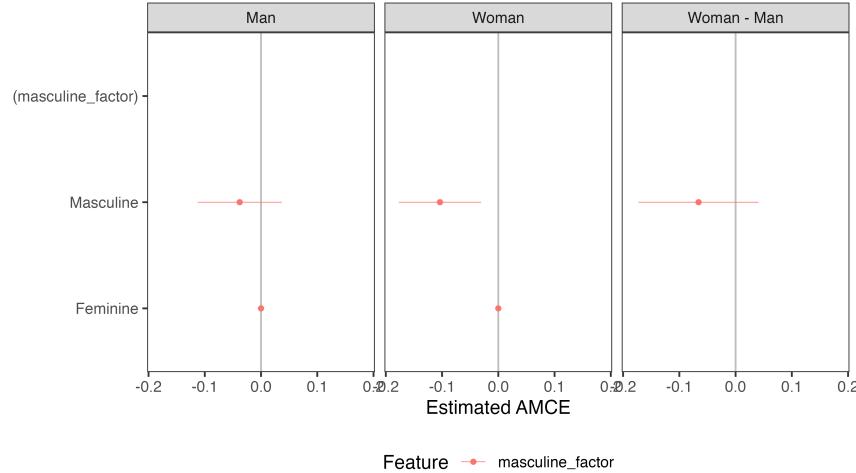


(b) Dependent Variable: Candidate Preference

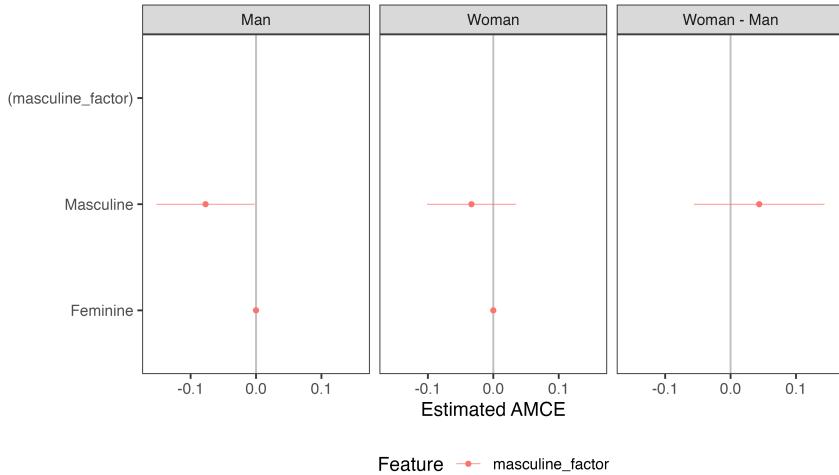
I also analysed the case for Caucasian candidates. However, for Caucasian women candidates, the level of facial masculinity does not significantly differ. Although, for Caucasian men candidates, I find that they can have an advantage when they have lower facial masculinity (7.7 pp, $p < 0.05$). The findings highlight the unique challenges faced by African American women candidates who may face discrimination based on both their race and a gendered physiological cue, shedding light on the importance of addressing multiple dimensions of identity (Ditonto, Stalsburg, and Andersen, 2010; Philpot and Walton, 2007; King,

1973). It is important to acknowledge that the present analysis may be limited by insufficient statistical power, thereby necessitating additional data collection.

Figure 4: Average component interaction effects (AMCIE) by both race and gender



(a) The effect of facial masculinity on candidate preference by gender among African American candidates



(b) The effect of facial masculinity on candidate preference by gender among Caucasian candidates

4.1 Heterogeneous effects

In accordance with the theoretical framework proposed by [Crowder-Meyer et al. \(2020\)](#) regarding varied levels of support for diversity in political representation, I expand the analysis

to test whether the outcomes observed for facial masculinity and the interaction of race and gender can be attributed to variations in support for these groups across different ideological orientations. During the pre-treatment questionnaire, the respondents were asked to indicate their ideological self-placement based on the measure for self-placement ideology utilised in the American National Electoral Study of 2020. In contrast to their conservative counterparts, politically liberal voters demonstrated a greater commitment to the representation, as evidenced in previous literature, of women ([Schwarz and Coppock, 2021](#)) and African American candidates ([López Ortega and Radojevic, 2023](#)), as presented in Figure 5a.

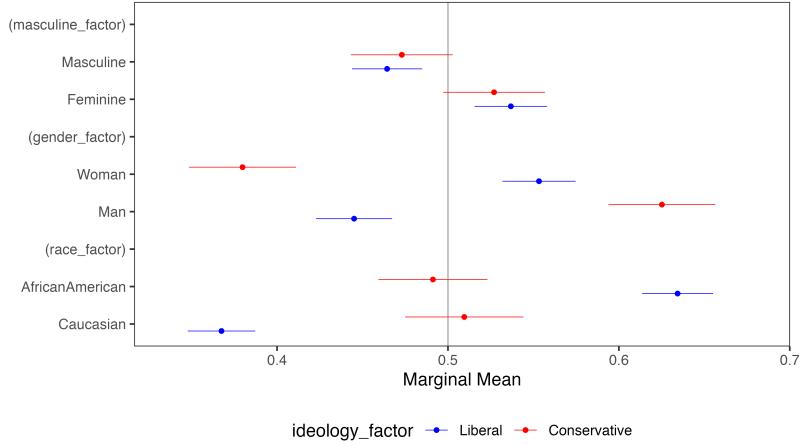
However, in spite of the fact that the display of masculine features has a greater influence on individuals who identify as conservatives than on those who identify as liberals, with a difference of 0.02 percentage points, I find no statistically significant difference leading to the rejection of H4. This indicates that the effect of displaying masculine features on voters' perceptions of masculinity may not differ substantially between conservatives and liberals. However, liberal voters show greater preference to choose women candidates (0.35 pp, $p < 0.01$) and African American candidates (0.28 pp, $p < 0.01$) than conservatives.

Figure 5b indicates that liberal voters demonstrate a noticeable inclination towards both African American and Caucasian candidates when they display more facial femininity. Notwithstanding, I show that conservative voters prefer less masculine-looking African American candidates and more masculine-looking Caucasian candidates compared to liberals. When it comes to the manner in which conservative voters evaluate the perceived masculinity of a candidate, I show that the race of the candidate functions as a moderator.

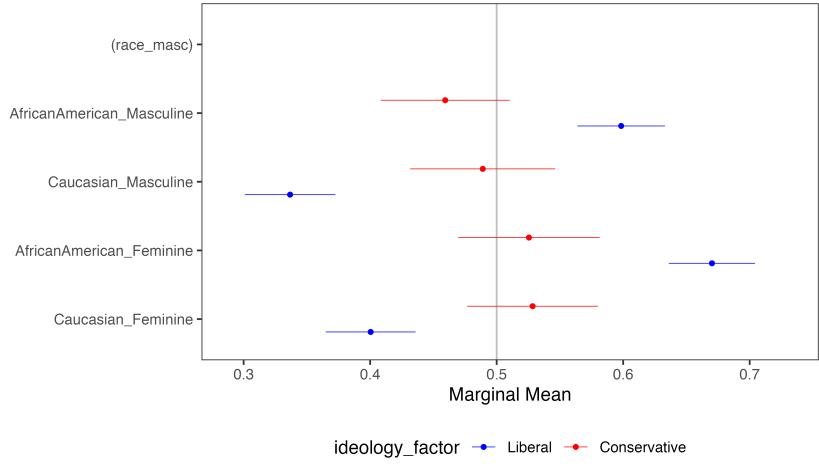
4.2 Mechanisms

To obtain a deeper understanding of the mechanisms underlying preferences for specific candidate attributes, I asked participants to rate each candidate they evaluated on a range of characteristics using a 0 to 10 scale. According to the scale, a score of 0 means the candidate is perceived to have a little of a certain trait, while a score of 10 means they are perceived to

Figure 5: Subgroup marginal means for respondent's ideology



(a) Marginal mean by respondent ideology



(b) Interaction marginal means by respondent ideology

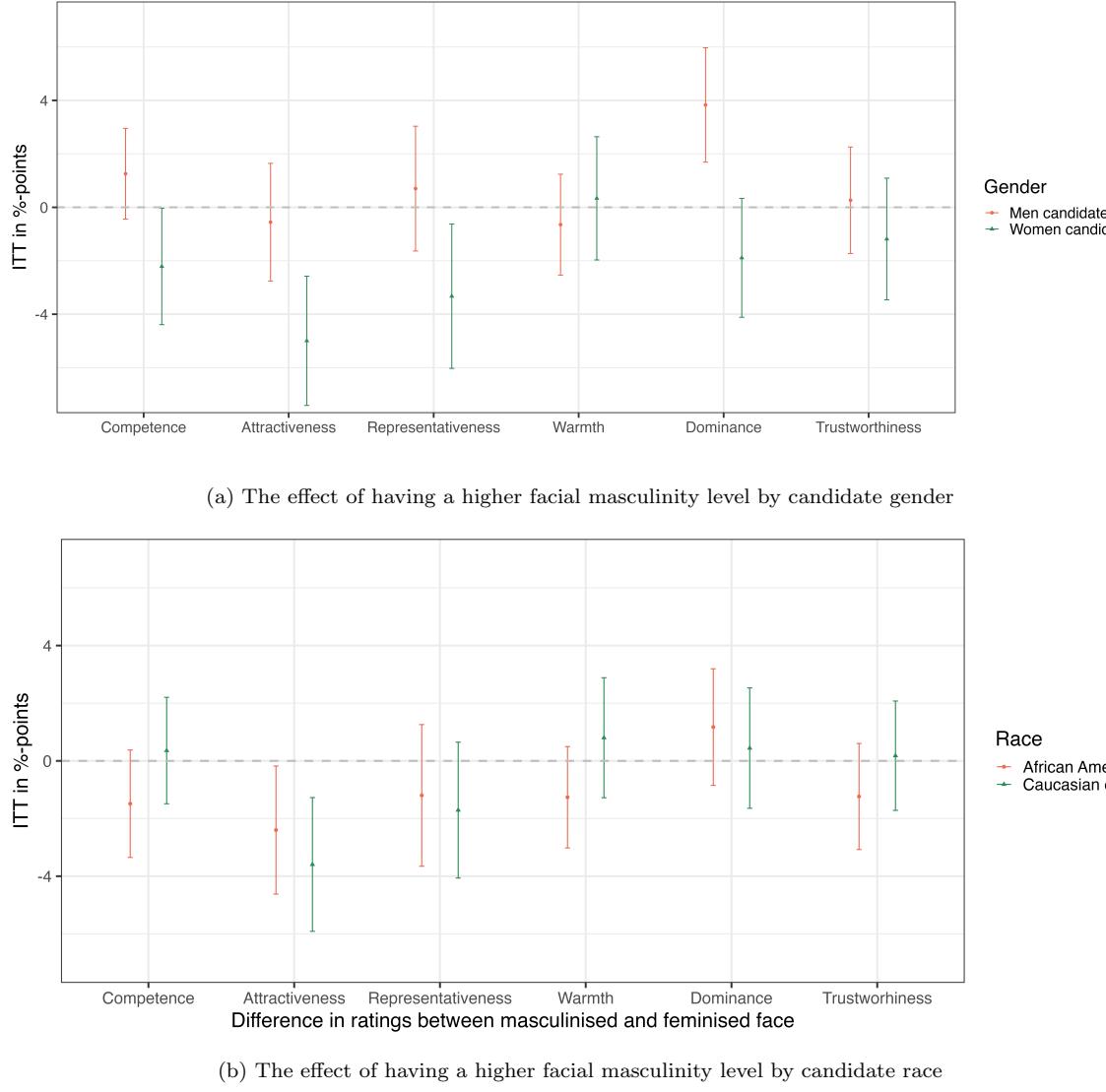
have a lot of that trait. In Figure 6, the results of the analysis are displayed, with each regression yielding a unique outcome, namely competence, attractiveness, representativeness, warmth, dominance and trustworthiness. The results are presented by candidate gender (Figure 6a) and by candidate race (Figure 6b).

The results show that one potential explanation for why respondents preferred to choose candidates with lower levels of facial masculinity, on average, might be attributed to the perceived lower attractiveness ratings of these candidates. For candidates from both racial categories as well as women, assessments of attractiveness are statistically significantly lower

for those with more facial masculinity than for the candidates with less. Compared to their co-racial counterparts, respondents rated African-American candidates with a more masculine appearance 2.4 pp less ($p < 0.05$) attractive. With 3.6 pp ($p < 0.01$), the negative effect is stronger for Caucasian candidates. The impact of facial masculinity on attractiveness ratings for women candidates shows parallel finding to the literature (Grammer and Thornhill, 1994) and particularly evident, with a statistically significant negative effect of 4.5 pp ($p < 0.01$). This is not surprising considering Ekrami et al. (2021)'s findings that shows extreme level of facial masculinity is not perceived to be attractive. In addition, Rhodes, Hickford, and Jeffery (2000) demonstrates that individuals, regardless of gender or race (i.e the two racial categories used in their experiment were Caucasian and Chinese), tend to perceive feminised faces as more attractive than masculinized faces. It is also possible that cultural conventions regarding an absence of sufficient feminine traits worked against the women candidates. In contrast, respondents did not show a significant distinction between levels of facial masculinity and femininity when evaluating men candidates in terms of perceived attractiveness.

In conjunction, respondents not only evaluated women candidates to be less attractive when they have more facial masculinity, but also less competent (3.3 pp, $p < 0.05$) and less representative (2.2 pp, $p < 0.05$). These mechanisms are helpful in explaining the findings presented in Figure 3b where respondents, on average, preferred less facial masculinity in women candidates. I did not find any significant effect of facial masculinity in warmth, dominance and trustworthiness ratings for women candidates. For men candidates, only the dominance ratings for more facial masculinity shows a significantly positive effect (3.8 pp, $p < 0.01$). This finding is likely attributable that male facial masculinity is highly associated with perceived dominance and strength, as previous research has demonstrated (Pivonkova et al., 2011). There is also empirical evidence that shows, inter-group conflict alone—not primes of cooperation— moves voter preferences for dominant leaders (Laustsen and Bor, 2017; Laustsen and Petersen, 2017). In this experiment, respondents evaluated the candidates in the uncertain reality of not knowing the conflict versus peace state of the electoral context. This might explain why a dominant perception of male facial masculinity failed to translate

Figure 6: Effect of the level of facial masculinity on the candidate ratings between a masculinised and a feminised face, 95% CIs.

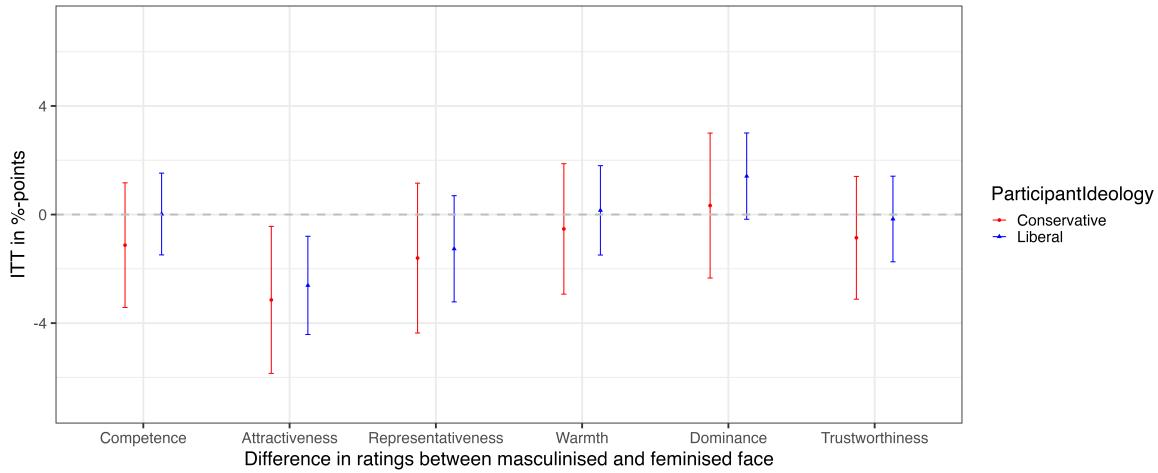


into a stronger voting preference (Figure 3b).

Furthermore, voters' ideologies may influence their assessment of facial masculinity on various candidate traits. However, as shown in Figure 7, the only trait that presents significant results is perceived attractiveness ratings. Candidates with more facial masculinity are perceived to be less attractive by both liberal and conservative voters, indicating that this phenomenon can transcend ideological lines. There is some evidence that voters of

any political affiliation prefer leaders who demonstrate a more nuanced blend of stereotypically masculine and feminine traits in their decision-making ([Meeks and Domke, 2016](#)). The reasons for this could be due to changing cultural standards, in which the traditional link between masculinity and leadership is giving way to a more open and nuanced concept of what makes a successful political leader. This shift in perspective exemplifies how political aesthetics are evolving to include a more holistic lens that takes into account a broader range of characteristics, regardless of party affiliation.

Figure 7: Effect of having a higher facial masculinity level by participant ideology, 95% CIs.



5 Conclusion

The impact of candidates' facial masculinity on voter behaviour is an intriguing and complex subject of investigation within the field of politics. I present empirical evidence to study the previously underresearched territory of visual cues, specifically those conveying gendered signals, in light of more recent empirical evidence from non-visual studies showing a preference for women candidates over their male counterparts. The findings offer useful insight into the shifting voter preference landscape, despite the fact that they were unexpected in pre-registered hypotheses.

Incorporating AI-generated photorealistic candidates to simulate voters' actual exposure to candidates, I used a novel visual survey experiment design. The method I use in this study has multiple implications for experimental political science. First, the tool used to generate virtual candidates opens up further avenues for future research with its potential for experimentally manipulating various physical features such as age, gender, and race, as well as going into a more tailored format that allows to manipulate skin colour, the depths of facial feature manipulation, and even the formal or informal type of clothing a virtual candidate might wear. Furthermore, research has demonstrated that paired conjoint experiments exhibit higher external validity compared to vignette survey experiments ([Hainmueller, Hangartner, and Yamamoto, 2015](#)). In addition, the visual presentation of the two candidate profiles in a choice task can even increase the external validity by simulating voters' real-life exposure to the political candidates. Experimentally mimicking how voters really see candidates leads to a discussion about this study's results and what they mean for future research in the field of experimental political science.

In the US, I find experimental support for the notion that lower levels of facial masculinity can significantly impact the manner in which voters perceive political candidates. Even though this finding was in the opposite direction of the pre-registered hypothesis and the positive association between masculinity and voter candidate evaluations is a well-established phenomenon, my findings are not unprecedented. Similarly, [Bernhard \(2022\)](#) discovered that voters in the United States, on average, showed a preference for politicians of both genders who were regarded as having feminine leadership styles. In addition, [Bos et al. \(2022\)](#) shows that young children envision men as political leaders, however, they define these candidates possessing as much feminine traits as masculine ones. While it cannot be immediately inferred that feminine leadership styles are correlated with the display of feminine facial features, my research findings contribute to the ongoing discourse on the influence of perceived masculinity on voter preferences. Even though there is still much room to ameliorate the diversity among political candidates and representatives, my findings can potentially open avenues for further research into whether, in the US, voters' inclinations have shifted towards politicians who

exhibit fewer masculine traits and behaviours.

The interaction between facial masculinity, race and gender further complicates the equation. I find that having a higher facial masculinity level might hurt African American women candidates' electoral gains more than a co-racial man candidate. The intermediate outcomes show that this might be due to their perceived low levels of attractiveness, competence, representativeness and dominance. Although there are empirical findings on the positive association between masculinity and dominance, competence and leadership ([Oh, Buck, and Todorov, 2019](#); [Wen et al., 2020](#); [Eagly and Karau, 2002](#)), I show that facial masculinity is an important factor to acknowledge when we evaluate the political representation of minority groups. Hence, in electoral contexts where candidates from diverse backgrounds seek political office, facial masculinity perceptions can be a sign of how voters perceive these candidates' traits that can eventually lead to their representation in the office. This emphasises the need for a nuanced comprehension of the interplay between race, gender and facial masculinity in influencing voter perceptions.

The study presented has certain limitations. First, I present a novel experimental design to show how one gendered facial cue can be influential along with other candidate descriptive traits in shaping voters' perceptions. However, one can expand this research question into various political contexts. For example, research suggests that politicians exhibiting more masculine facial features tend to be perceived as more dominant and competent, particularly during periods of crisis or ambiguity ([Spisak et al., 2012](#)). [Lawless \(2004\)](#) find that in the time of crisis, women are disadvantaged when political circumstances elevate traditionally masculine issues, such as war. Voters may exhibit an intrinsic inclination to support candidates who demonstrate the capacity to safeguard and cater to the needs of their electorate during challenging situations. Additionally, social norms and cultural expectations affect the perception of facial masculinity. As a result of cultural aesthetic standards and gender conventions, different cultures may have varying notions of what constitutes a masculine visage. These cultural differences influence the effect of facial masculinity on voter behaviour further, as preferences and perceptions vary across societies. Additional research may expand upon

these findings by incorporating further interaction among the aforementioned variables.

Second, in the present study, the omission of any political party cue in the experimental design was intentional, as it aimed to replicate election scenarios wherein the political party affiliation of candidates is either withheld (e.g., municipal or county office elections) or held constant (e.g., US presidential primaries). The purpose of this was to mitigate the impact of partisanship. In a conjoint experiment, [Kirkland and Coppock \(2018\)](#) show that the preference for candidate's race and gender does not significantly differ to the presence of candidates' political party as a cue. The outcomes delineated in this paper exhibit heterogeneity in their effects based on the ideologies of the respondents. Even though [Carpinella and Johnson \(2013\)](#) suggests that individuals who exhibited more feminine traits were more accurately classified as Republicans, whereas those who displayed less feminine traits were more accurately classified as Democrats, I show support that the preference for facial masculinity holds across ideologies. In addition, there is empirical evidence that the perception of African American women candidates align them with more liberal viewpoints ([Schneider and Bos, 2011](#)). However, when I limit the analysis to choice tasks where participants chose between two male Caucasian candidates, which makes it ambiguous to infer what a candidate's ideology is, I also find a preference for a lower level of facial masculinity. Further research may delve deeper into the matter by explicitly referencing the political party of the candidate while maintaining consistency, or by prompting respondents to evaluate the perceived party affiliation or ideology of the observed candidate.

The objective of this study is to initiate discourse on the significance of facial masculinity perceptions, with a particular emphasis on their multifaceted function in relation to the candidate's race and gender. The influence of facial masculinity on voter behaviour is a complex phenomenon that is influenced by evolutionary psychology, race, gender, culture, and social norms. Despite the fact that facial masculinity can affect our perceptions of dominance, competence, and strength, it is necessary to consider it alongside other factors when evaluating political candidates.

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A Appendix

A.1 Sample Statistics

This section provides an overview of the key attributes of the Cloud Research sample and the American National Election Studies (ANES), which is used as reference points and for survey weighting purposes. The sample population of CloudResearch exhibits characteristics that are indicative of a younger demographic, possessing higher levels of education, and displaying a greater inclination towards liberal ideologies compared to the national average.

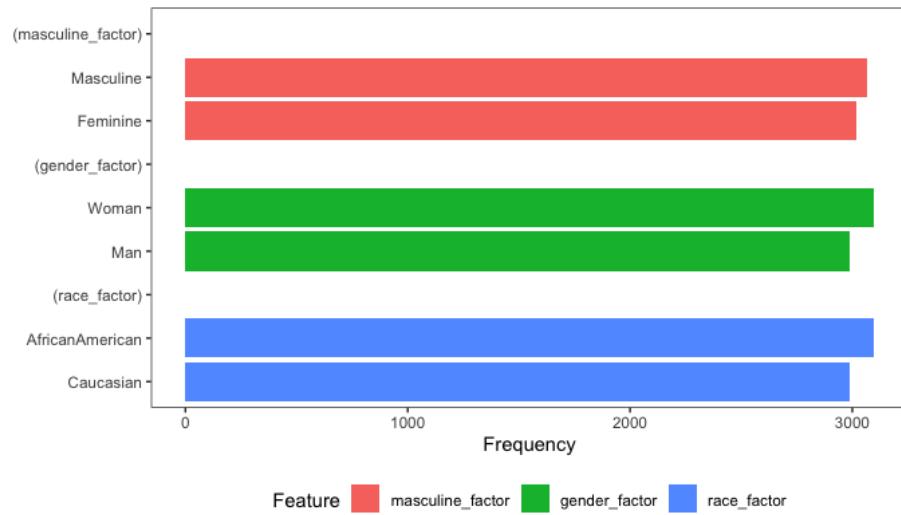
Table A.1: Sample characteristics

	Cloud Research Sample	ANES
Year	2023	2020
Age		
18-34	41%	26%
35-55	45%	31%
56+	15%	43%
Women	50%	54%
University graduates	61%	44%
Caucasian	65%	72%
Ideology		
Liberal	72%	52%
Conservative	28%	48%

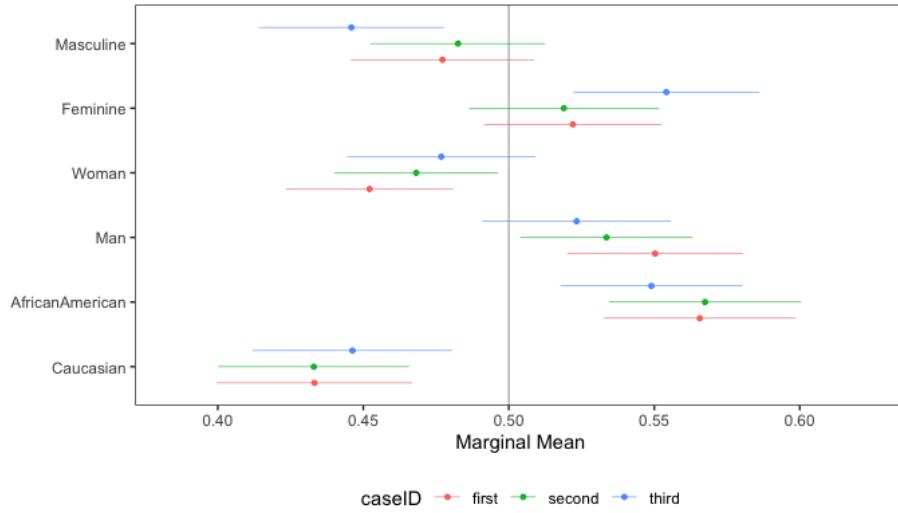
A.2 Diagnostics

The diagnostic measures employed in this section ensure that the levels of each attribute in Figure A.1a are presented in a nearly equal manner. Additionally, Figure A.1b indicates that there is no discernible profile spillover effect, which refers to any systematic changes in response to attributes within the given number of tasks. Based on the available data, there is no reason to suspect the presence of such an effect.

Figure A.1: Design diagnostics



(a) Frequencies of displayed levels of attributes

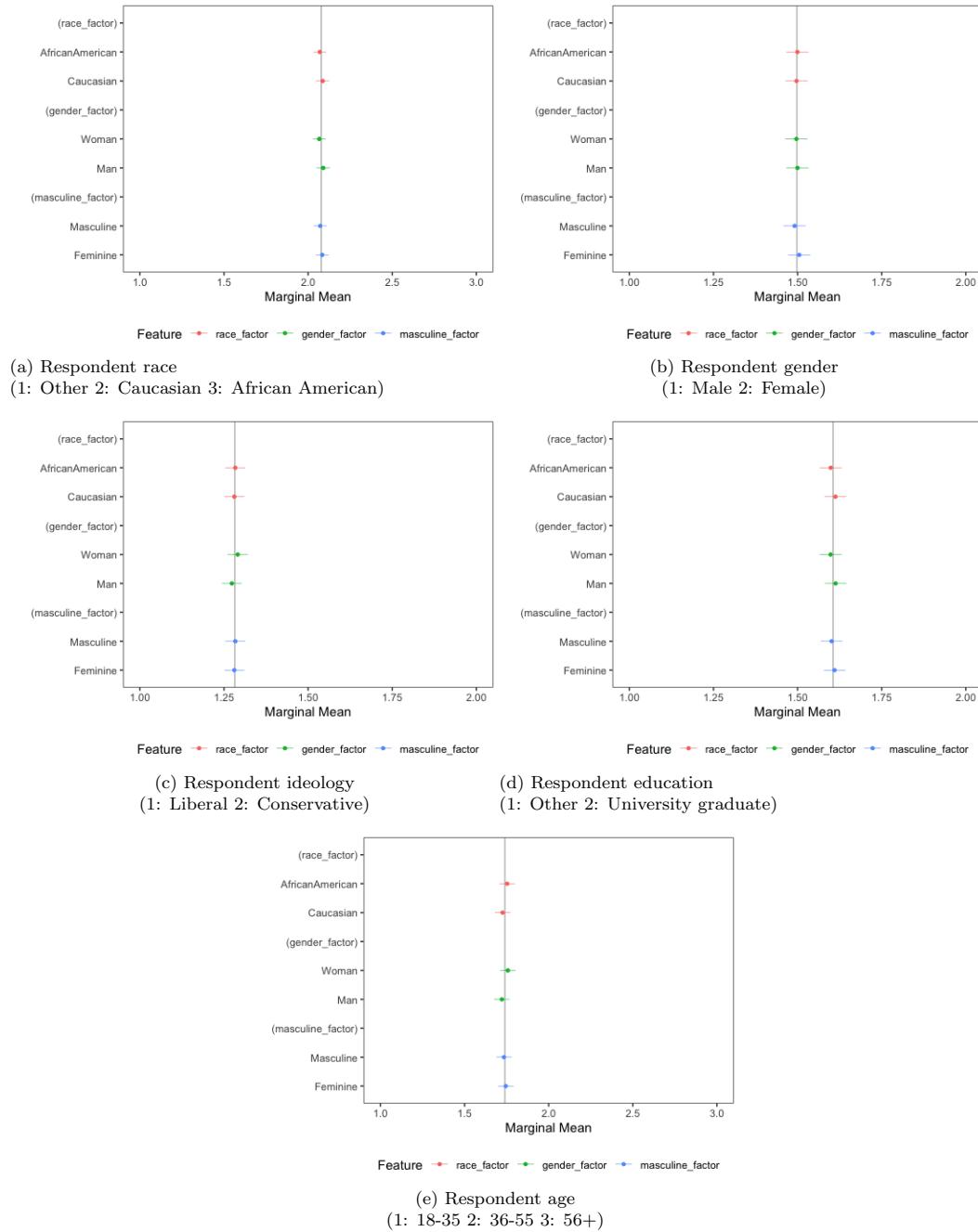


(b) Profile spillover effects

A.3 Balance Testing

The confidence intervals for each feature presented in Figure A.2 exhibit close proximity to the mean, thus indicating a lack of evidence to suggest the presence of any imbalance issue.

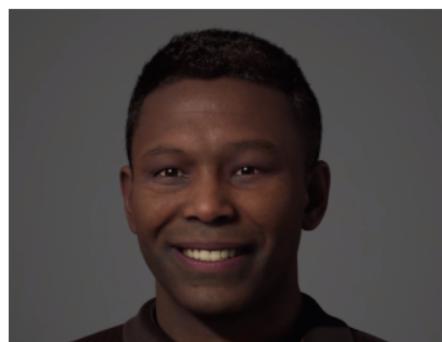
Figure A.2: Balance Tests



A.4 Pre-test Validation Task

Figure A.3: Screenshot of validation task

How would you rate the person in the pictures on perceived masculinity? Please rate on a 1 to 3 where 1 stands for the most masculine and 3 stands for the least masculine. To rank the pictures, drag and drop each picture.

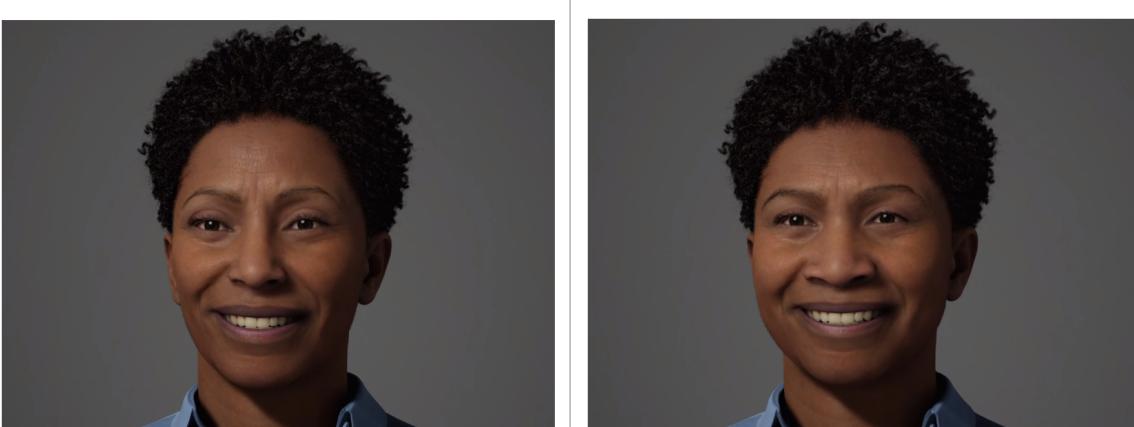


A.5 Example facial masculinity manipulation

Figure A.4: Example of facial masculinity manipulation from lower level of facial masculinity to higher



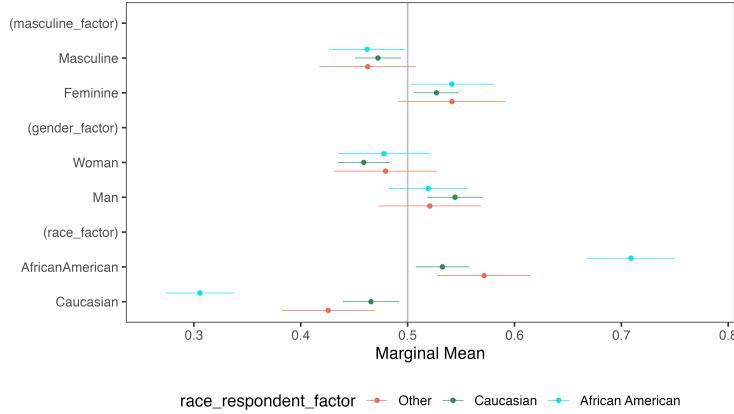
(a) Example from a Caucasian man candidate



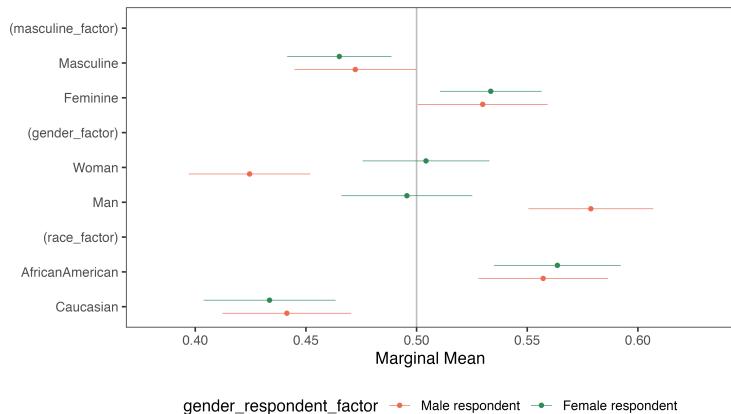
(b) Example from an African American woman candidate

A.6 Subgroup analyses

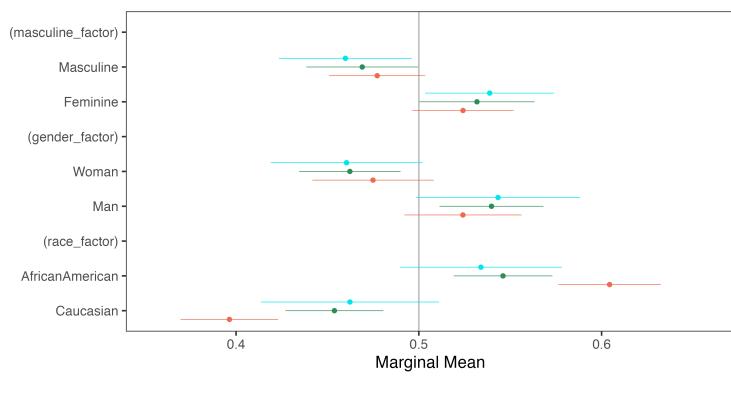
Figure A.5: Marginal means for subgroup analysis



(a) Marginal means by respondent race



(b) Marginal means by respondent gender



(c) Marginal means by respondent age

A.7 Analysis and Regression tables

The Average Marginal Component Effect (AMCE) and Average Marginal Component Interaction Effect (AMCIE) can be computed by employing regression models of the following structure:

$$Y_{i,j,k} = \beta_0 + \beta_1 FacialMasculinityLevel_{i,j,k} + \beta_2 Gender_{i,j,k} + \beta_3 Race_{i,j,k} + \epsilon_i \quad (1)$$

$$\begin{aligned} Y_{i,j,k} = & \beta_0 + \beta_1 Race_{i,j,k} + \beta_2 FacialMasculinityLevel_{i,j,k} + \\ & \beta_3 Race_{i,j,k}xFacialMasculinityLevel_{i,j,k} + \epsilon_i \end{aligned} \quad (2)$$

$$\begin{aligned} Y_{i,j,k} = & \beta_0 + \beta_1 Gender_{i,j,k} + \beta_2 FacialMasculinityLevel_{i,j,k} + \\ & \beta_3 Gender_{i,j,k}xFacialMasculinityLevel_{i,j,k} + \epsilon_i \end{aligned} \quad (3)$$

where i indicates the subject, j indicates the scenario, and k indicates the choice task. In this experimental setting, $i \in 1, 2, \dots, 1000$, $j \in 1, 2$ and $k \in 1, 2, 3$. Each subject i produces six observations: three rounds with two options each round.¹ Y represents the main outcome variables. Gender is a binary variable and takes 1 when the evaluated hypothetical candidate is a woman and 0 otherwise. Race is also a binary variable and takes 1 when the evaluated candidate is African American and 0 otherwise. The facial masculinity score is 1 if the computer-generated candidate's face has been altered to appear more masculine, and 0 otherwise.

¹Standard errors are clustered by the subject.

Table A.2: The effect of candidate attributes on vote choice, 95% CIs.

Dependent variable: Vote preference		
(Intercept)	0.50*** (0.02)	0.51*** (0.02)
Facial masculinity (Masculinised face=1) (Feminised face=0)	-0.06*** (0.02)	-0.06*** (0.02)
Gender (Woman=1) (Man=0)	-0.07*** (0.02)	-0.07*** (0.02)
Race (African American=1) (Caucasian=0)	0.12*** (0.02)	0.12*** (0.02)
Covariate adjusted	No	Yes
R ²	0.02	0.02
Adj. R ²	0.02	0.02
Num. obs.	6084	6084
N Clusters	1014	1014

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Note: Covariates are gender, age, race, education, and ideology of the respondents.

Table A.3: Interaction effects, 95% CIs.

Dependent variable: Vote preference				
	0.47*** (0.02)	0.47*** (0.02)	0.56*** (0.02)	0.57*** (0.02)
Facial masculinity (Masculinised face=1) (Feminised face=0)	-0.06** (0.03)	-0.06** (0.03)	-0.06** (0.03)	-0.06** (0.03)
Race (African American=1) (Caucasian=0)	0.13*** (0.03)	0.13*** (0.03)		
Facial masculinity x Race	-0.01 (0.04)	-0.01 (0.04)		
Gender (Woman=1) (Man=0)			-0.06** (0.03)	-0.06** (0.03)
Facial masculinity x Gender			-0.01 (0.04)	-0.01 (0.04)
Covariate adjusted	No	Yes	No	Yes
R ²	0.02	0.02	0.01	0.01
Adj. R ²	0.02	0.02	0.01	0.01
Num. obs.	6084	6084	6084	6084
N Clusters	1014	1014	1014	1014

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Note: Covariates are gender, age, race, education, and ideology of the respondents.

A.8 Ethics

In this study, I present participants with fictitious candidate photographs and request their evaluation of them subsequent to obtaining their informed consent. I gave the U.S. participants the information and consent form shown in Figure A.6 before they begin the survey and the debrief form shown in Figure A.7 after they complete the survey but before submitting their responses. I show participants images of fake candidates generated with artificial intelligence (AI), which may or may not accurately reflect the appearance of the actual candidates running for office. This study therefore stimulates inquiries regarding deceit. Ethical approval for this study was granted by [*the name of the author's institution*] IRB after it was shown to comply with the APSA's Guidelines and Principles for Research with Human Subjects (APSA, 2020).

The study addresses the ethical considerations involved in exposing research participants to fake virtual representations for evaluation. In accordance with the APSA's recommendation that subjects' autonomy be respected when using deceit, I conducted a post-study debriefing with all participants at the same time. During the debriefing, I brought up the issue of image manipulation and made it clear that the candidate photos they had evaluated were created with AI. I confirm that my study adheres to the standards set forth by the American Psychological Association for studies involving human participants (APSA, 2020).

Figure A.6: Consent and information form

Dear participant,

Thank you for considering participating in this study. This information sheet outlines the purpose of the research and describes your involvement and rights as a participant if you agree to participate.

I am interested in understanding individuals' political candidate preferences. You will be presented with the photos of some candidates and asked to answer some questions about them. The study should take around 6-8 minutes to complete. It is up to you to decide whether or not to take part. You do not have to take part if you do not want to. If suppose you do decide to take part; tick the box below.

You can withdraw from the study until March 1st 2023, without having to give a reason before clicking the submit button or by writing an email to *[the contact details of the author]*. Withdrawing from the study will not affect your current and future connection with the researcher. If you withdraw from the study, I will not retain the information you have given thus far unless you are happy for me to do so.

I will use the collected information for a research project. The records from this study will be kept as confidential. Only *[the contact details of the author]* will access the files. Your data will be anonymised – your name will not be used in any reports or publications resulting from the study. Such information will be treated according to the UK Data Protection Act 2018 and the new General Data Protection Regulations (GDPR). All digital files will be given codes and stored separately from any participants' names or other direct identification. Any hard copies of research information will always be kept in locked files.

This study has undergone an ethics review (Ref: 90881) following the *[name of the institution]* Ethics Policy and Procedure. The *[name of the institution]* Privacy Policy can be found at: *[link to the institution's ethics approval procedure]*.

If you have any questions regarding this study, please contact the researcher, *[the contact details of the author]*.

If you have any concerns or complaints regarding the conduct of this research, please contact *[the contact details of the institution]*.

If you are happy to participate in this study, please sign the consent sheet attached/below.

I agree to participate

I decline to participate

Figure A.7: Debrief form

Thank you for participating in our study on understanding individuals' political candidate choices.

Please read the information on this form carefully to learn essential details regarding your participation in this study.

Following this debriefing, you may request that the information we gathered about you be removed from this research project.

It was essential for this study that we conceal some information from you regarding specific components of the study. Now that your participation is complete, we will explain what information was withheld. You will be given the option of having your data included in this study or having it removed from it.

What You Need to Know About This Research

Before you started participating in this study, you were informed that you would be *evaluating the photographs of some candidates*. However, the fact that these images were all made digitally was not disclosed. That is because your responses need not be impacted by knowing this information.

Your Data Withdrawal Rights

You can choose whether or not to have your data removed from the research now that you know the true nature of the *individual photographs* you have evaluated. If you withdraw from the study, there will be no penalties or negative repercussions for you. Before you decide, please send the researcher any questions you have through email at [*the contact details of the author*]. You can also contact the researcher from this email address to withdraw from the study.

Confidentiality

Whether you agree to have your data used in this study or not, please bear in mind that the integrity of this research was dependent on keeping some aspects hidden from you and the other participants. Although the processes for creating the *individuals in the photographs* used in this study are not mentioned to you at the start, *everything else on the consent form is correct*. We will keep any information we know about you completely confidential, including your decision to drop out of the study.

If You Have Any Questions or Concerns

Please keep a copy of this Debriefing Form for future reference. If you have any questions or concerns about this study and the research procedures used, you may contact the researcher, [*the contact details of the author*]. If you would like to receive a copy of the final report of this study or a summary of the findings when it is complete, please feel free to get in touch.

A.9 Deviations from the pre-analysis plan

The main paper exhibits a few deviations from the pre-registration, as shown in the anonymized version accessible at the following link: [*click here for the anonymised version*]. My discussion of any deviations from the PAP may be found in the sections that follow.

A.9.1 Hypotheses

I include two of the preregistered hypotheses in this section in Appendix so as to maintain narrative coherence throughout the main body of this manuscript. Although not stated clearly in the main text, the testing of these hypotheses are fundamental to the study's design, was elaborated upon in the main body of the text. To balance transparency and readability, I moved two of my preregistered hypotheses to this appendix. This allows readers to see the full range of preregistered hypotheses while maintaining the primary research presentation's clarity.

Hypothesis A.1. *Respondents are more likely to choose Caucasian candidates than African American candidates.*

Figure 2a shows that African American candidates are preferred more than Caucasian candidates hence leading not to reject the null hypothesis. The findings underscore the fact that, on average, African American candidates receive 12.3 percentage points more support than their Caucasian counterparts.

Hypothesis A.2. *Respondents are more likely to choose Caucasian women with more masculine features followed by Caucasian men with more masculine features compared to their counterparts with fewer masculine features.*

In Figure 4b, I examined the candidate pool for Caucasian candidates. The degree of facial masculinity, on the other hand, does not vary significantly between men and women candidates, hence I was unable to reject the null hypothesis. The direction of the effect shows only substantive support for the HA.2. When it comes to Caucasian women candidates, I

find that they have an advantage when they possess a higher degree of facial masculinity than their men counterparts (7.7 pp, $p < 0.05$).

A.9.2 Exploratory analysis

Testing the mechanisms that have the ability to mediate the influence of facial masculinity on vote choice was a part of the exploratory analysis that was preregistered. I make a note of the need to conduct a test for perceived attractiveness, perceived competence, and perceived warmth in the preregistration. In addition to those, as was shown in Figures 6a, 6b, and Figure 7, I furthermore included perceived trustworthiness, perceived dominance, and perceived representatives as intermediate outcomes. The results on the perceived dominance of men and the perceived representativeness of women candidates, are discussed in further depth in Section 4.2.

A.9.3 Outcome variables

In the main text, I describe the results of the binary vote choice as the main outcome variable. The primary results does not, however, address the second pre-registered outcome variable that asked participants to rate their likelihood of voting for each of the two candidates on a scale from 0 to 100 for each choice task. Tables A.4 and A.5 include my findings. Taken as a continuous likelihood of voting scale, the direction and significance of the major findings remain similar to those in Table A.3 and Figure 2a. In assessing how a candidate's race and gender interact with their facial masculinity, Table A.5 indicates that this interaction is not significant, despite the negative coefficient, which only supports my interpretation that African American candidates who exhibit higher levels of facial masculinity fare worse than Caucasian candidates who exhibit higher levels of facial masculinity. This is very similar to the main findings shown in Figure 3a. Using the continuous outcome scale, however, makes a difference since it substantially and negatively affects the interaction between candidate gender and facial masculinity, which means that women candidates with higher levels of

facial masculinity are preferred less than those with lower levels. Using a continuous outcome measure offers stronger statistical support for the conclusion that facial masculinity and gender have a negative but non-significant interaction (Figure 3b).

Table A.4: The effect of candidate attributes on continuous voting preference, 95% CIs.

Dependent variable: Continuous Vote preference (0-100)		
(Intercept)	56.90*** (0.88)	56.65*** (2.39)
Facial Masculinity (Masculinised face=1) (Feminised face=0)	-1.86** (0.82)	-1.79** (0.80)
Gender (Woman=1) (Man=0)	-4.24*** (1.19)	-4.14*** (1.18)
Race (African American=1) (Caucasian=0)	6.29*** (0.97)	6.40*** (0.96)
Covariate adjusted	No	Yes
R ²	0.03	0.04
Adj. R ²	0.03	0.04
Num. obs.	6060	6060
N Clusters	1014	1014

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Note: Covariates are gender, age, race, education, and ideology of the respondents.

Table A.5: Interaction effects, 95% CIs.

Dependent variable: Continuous Vote preference (0-100)				
	54.57*** (0.88)	54.50*** (2.33)	59.24*** (1.01)	58.96*** (2.48)
Facial masculinity	-1.50	-1.62	-0.13	-0.06
(Masculinised face=1)	(1.17)	(1.19)	(1.05)	(1.07)
(Feminised face=0)				
Race	6.69*** (1.32)	6.63*** (1.32)		
(African American=1)				
(Caucasian=0)				
Facial masculinity x Race	-0.78 (1.67)	-0.42 (1.69)		
Gender			-2.59* (1.49)	-2.50* (1.50)
(Woman=1)				
(Man=0)				
Facial masculinity x Gender			-3.32* (1.84)	-3.31* (1.82)
Covariate adjusted	No	Yes	No	Yes
R ²	0.02	0.04	0.01	0.03
Adj. R ²	0.02	0.03	0.01	0.02
Num. obs.	6060	6060	6060	6060
N Clusters	1014	1014	1014	1014

*** $p < 0.01$; ** $p < 0.05$; * $p < 0.1$. Note: Covariates are gender, age, race, education, and ideology of the respondents.