



# Facial Masculinity Increases Perceptions of Men's Age, But Not Perceptions of Their Health: Data From an Arab Sample

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## Abstract

Masculine characteristics in men's faces are often assumed to function as health cues. However, evidence for this assumption from empirical tests is mixed. For example, research on Western women's face perceptions found that masculinized versions of men's faces were perceived to be older, but not healthier, than feminized versions. Since research on this topic has focused on Western women's face perceptions, we investigated the effects of masculinizing face images on Arab women's perceptions of men's health (study 1,  $N = 211$ ) and age (study 2,  $N = 209$ ). Arab women perceived masculinized versions of male face images to be older, but not healthier, than feminized versions. These results add to a growing body of evidence challenging the assumption that male facial masculinity functions primarily as a health cue.

## Introduction

Although masculine characteristics in men's faces are often assumed to function as a health cue (Little et al. 2011; Thornhill & Gangestad 1999; Rhodes 2006), evidence for this assumption is mixed. For example, tests for correlations between masculine characteristics in men's faces and measures of actual health have reported both positive (e.g., Foo et al., in press; Thornhill & Gangestad 2006; Rhodes et al. 2003) and null (e.g., Boothroyd et al. 2013; Foo et al.

2017; Zaidi et al. 2019) results. Evidence that women's preferences for masculine characteristics in men's faces are stronger when women are in environments or hormonal conditions in which they might be expected to place greater emphasis on health when choosing mates (e.g., where childhood mortality is high or during the fertile menstrual cycle phase) is also equivocal (DeBruine et al. 2010; Jones et al. 2018; Penton-Voak et al. 1999; Scott et al. 2014).

Findings from studies that investigated whether exaggerating masculine shape characteristics in images of men's faces increases women's perceptions of men's health have also not suggested that masculine characteristics in men's faces function primarily as a health cue. A study of UK women's face perceptions (Boothroyd et al. 2005) found that masculinized versions of male face images looked older, but not healthier, than feminized versions. Although explicit health perceptions may not necessarily be a requirement for preferences for health mates to occur, these results do appear to challenge the claim that masculine characteristics in men's faces function primarily as a health cue. Instead, these results suggest that facial masculinity may function as an age cue.

A limitation of much previous research on women's perceptions of masculine characteristics in men's faces is that it focused mainly on judgments by women in Western countries. Indeed, many researchers have emphasized the importance of expanding this focus so that non-Western women's perceptions are also represented in the literature (Alharbi et al. 2020; Marcinkowska et al. 2019; Scott et al.

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2014). Representing such women is particularly important, since many researchers have argued that face perceptions should be stable across cultures (Rhodes 2006). For example, Scott et al. (2014) reported cultural differences in judgments of the attractiveness and aggressiveness of masculinized versus feminized faces.

In light of the above, we replicated Boothroyd et al. (2005) study of the effects of facial masculinity on women's perceptions of men's health (study 1) and age (study 2). However, we tested Arab women's judgments. If effects of masculinity on perceptions of health and age are similar for UK and Arab women, masculinizing male face images will increase perceptions of men's age, but not perceptions of their health.

## Study 1: Health perceptions

### Methods

#### Participants

Two hundred and eleven Arab women (mean age = 23.29 years, SD = 7.70 years) participated in this online study (faceresearch.org, DeBruine 2019). Participants were recruited using links to an online study of face perceptions on Saudi Arabian social media and were from Saudi Arabia, Algeria, Jordan, Oman, Egypt, and Kuwait.

#### Stimuli

Stimuli were manufactured using methods used in previous studies on this topic (e.g., DeBruine et al. 2010; Jones et al. 2018; Perrett et al. 1998), from an open access set of Turkish face images (Saribay et al. 2018), and using standard computer graphic methods (DeBruine 2018; Tiddeman et al. 2001). Eleven images of people wearing glasses or headscarves that obscured the face were removed from the image set.

First, we manufactured a female prototype by averaging the shape, color, and texture information from 142 female images. Next, we manufactured a male prototype by averaging the shape, color, and texture information from 111 male images. Finally, we created masculinized and feminized versions of 60 of the individual face images (30 male, 30 female) by adding or subtracting 50% of the differences in 2D shape between the male and female prototypes to each of 60 individual faces randomly selected from the full image set.

This process created 30 male and 30 female pairs, with each pair consisting of a masculinized and feminized version of a given face (Alharbi et al. 2020).

### Procedure

The 60 pairs of faces were shown in a fully randomized order, with the side of the screen on which the masculinized and feminized versions were presented also fully randomized. Participants were instructed (in Arabic) to click on the face in each pair that looked healthier.

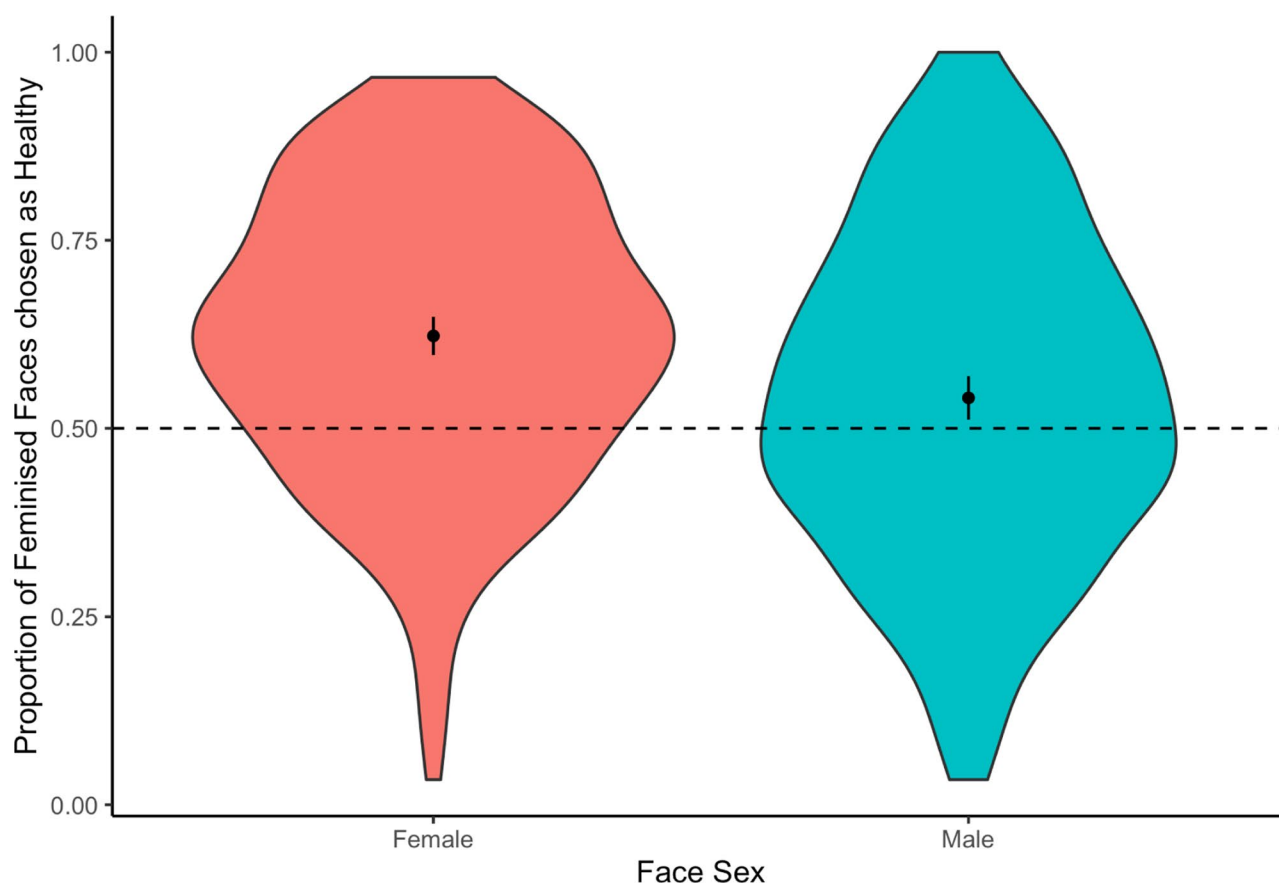
Forced-choice paradigms can produce qualitatively different patterns of results to other methods for assessing perceptions of faces (Jones & Jaeger 2019). We used the forced choice method in the current study to allow our results to be directly compared with those of Boothroyd et al. (2005).

## Results

Data, output, and analysis code are available at <https://osf.io/vhgbn/>. Responses were analyzed with binomial mixed effects models using the lme4 (Bates et al. 2015) and lmerTest (Kuznetsova et al. 2015) package in the R software (R Core Team 2013). Participant's choice was the dependent variable (chose masculinized = 0, chose feminized = 1). Participant age (z-standardized at the participant level) and sex of face (effect coded: male = -0.5, female = 0.5) were predictors. Random slopes were specified maximally (Barr et al. 2013). Results are summarized in Fig. 1.

In this initial analysis, the intercept was significant and positive (estimate = 0.41, SE = 0.09,  $z = 4.56$ ,  $p < 0.001$ ). Converting this estimate to proportions, this equates to women choosing, on average, the feminized versions as the healthier face on 60% of trials. The main effect of participant age was not significant (estimate = -0.09, SE = 0.06,  $z = -1.35$ ,  $p = 0.177$ ), but the main effect of sex of face was significant (estimate = 0.35, SE = 0.14,  $z = 2.52$ ,  $p = 0.012$ ).

When male and female faces were analyzed separately, the intercept was significant for female faces (estimate = 0.60, SE = 0.11,  $z = 5.41$ ,  $p < 0.001$ ), but not for male faces (estimate = 0.21, SE = 0.11,  $z = 1.84$ ,  $p = 0.066$ ). This equates to, on average, women choosing the feminized version as the healthier face on 65% of female-face trials and 55% of male-face trials. The effect of participant age was not significant for either sex of face (female faces: estimate = -0.12, SE = 0.07,  $z = -1.78$ ,  $p = 0.075$ ; male faces: estimate = -0.01, SE = 0.08,  $z = -0.18$ ,  $p = 0.859$ ).



**Fig. 1** Violin plots showing distributions of the proportion of feminized versions of male and female faces chosen as healthier by Arab women. Dots and lines show mean and 95% confidence intervals, respectively

## Study 2: Age perceptions

### Methods

Stimuli, recruitment, and testing procedure were identical to those used in study 1, except that we asked participants to select the face that looked older and tested 209 women (mean age = 23.27 years, SD = 7.15 years).

### Results

Analyses were identical to those used in study 1. Results are summarized in Fig. 2. Data, output, and analysis code are publicly available at <https://osf.io/vhgbn/>.

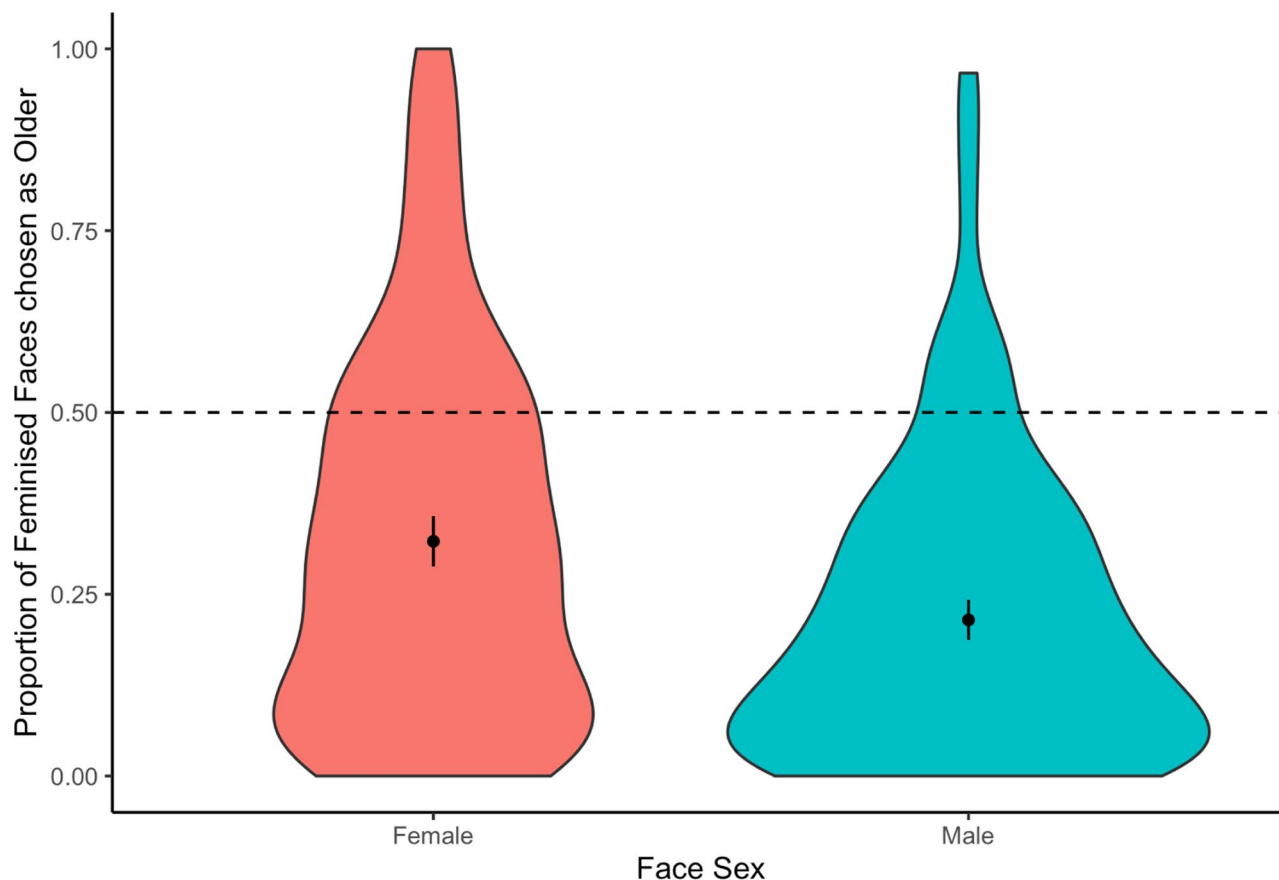
In the initial analysis, the intercept was significant and negative (estimate =  $-1.42$ , SE =  $0.11$ ,  $z = -13.00$ ,  $p < 0.001$ ). Converting this estimate to proportions, this equates to women choosing, on average, the feminized version as the older face on 19% of trials. The main effect of participant age was not significant (estimate =  $-0.00$ , SE =  $0.11$ ,  $z = -0.02$ ,  $p = 0.99$ ), but the main effect of sex

of face was significant (estimate =  $0.71$ , SE =  $0.09$ ,  $z = 7.77$ ,  $p < 0.001$ ).

When male and female faces were analyzed separately, the intercept was significant and negative for both female faces (estimate =  $-1.05$ , SE =  $0.12$ ,  $z = 8.70$ ,  $p < 0.001$ ) and male faces (estimate =  $-1.76$ , SE =  $0.11$ ,  $z = -15.65$ ,  $p < 0.001$ ). This equates to, on average, women choosing the feminized version s the older face on 26% of female-face trials and 15% of male-face trials. The effect of participant age was not significant for either sex of face (female faces: estimate =  $-0.02$ , SE =  $0.11$ ,  $z = -0.22$ ,  $p = 0.83$ ; male faces: estimate =  $0.01$ , SE =  $0.11$ ,  $z = 0.11$ ,  $p = 0.91$ ).

### Discussion

We investigated the effects of masculinizing male face images on Arab women's perceptions of men's health and age. Masculinized versions were judged to look older, but not healthier, than feminized versions. This pattern of results replicated Boothroyd et al. (2005) results for UK women. Both results challenge the assumption that male facial



**Fig. 2** Violin plots showing distributions of the proportion of feminized versions of male and female faces chosen as older-looking by Arab women. Dots and lines show mean and 95% confidence intervals, respectively

masculinity functions primarily as a health cue, instead suggesting it functions as a cue of age.

For judgments of women's faces, we found that Arab women perceived masculinized versions to look older and less healthy than feminized versions. This is consistent with results of previous research suggesting that femininity has robust positive effects on perceptions of women's health and youth (e.g., Perrett et al. 1998).

An unresolved issue is whether this pattern of results generalizes to other types of testing paradigm. We used a forced choice paradigm that some researchers have suggested can produce qualitatively different patterns of results to other types of testing paradigm (e.g., ratings of individual faces, Jones & Jaeger 2019). Further work would be needed to clarify this issue.

Interestingly, our analyses suggest that the effect of masculinizing shape can be quite variable across face images. This is in many ways unsurprising, since individual faces vary in the degree to which they display sexually dimorphic shape characteristics and so manipulating face shape would be expected to have somewhat different effects on different faces. Further work investigating the

characteristics of the original face images that influences the degree to which masculinizing faces may shed light on this issue.

Our findings for Arab women's perceptions of men's health and age add to a growing body of research challenging the common assumption in the mate preference literature that facial masculinity is a cue of men's health. Together with other recent work suggesting Arab women perceive men with masculinized faces to be particularly dominant (Alharbi et al. 2020), they also add to a growing body of evidence suggesting that facial masculinity primarily functions as a cue to men's age and dominance, as some researchers have previously proposed (Boothroyd et al. 2007; Scott et al. 2013).

**Acknowledgements** S Adil Saribay was supported by the Czech Science Foundation project regno 18-10298S.

**Funding** University of Glasgow

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