



## Short Communication

# In the face of dominance: Self-perceived and other-perceived dominance are positively associated with facial-width-to-height ratio in men



V.R. Mileva\*, M.L. Cowan, K.D. Cobey, K.K. Knowles, A.C. Little

University of Stirling, School of Natural Sciences, Psychology, Stirling FK9 4LA, UK

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## ABSTRACT

In recent research, facial width-to-height ratio (fWHR) has garnered considerable attention because it has been linked with different behavioural characteristics (e.g., achievement drive, deception, aggression). Here we examined whether other-perceptions and self-perceptions of dominance are related to fWHR. In study 1, we found that other-perceived dominance was positively associated with fWHR, but only in men. In studies 2 and 3, using two different self-perceived dominance scales, and two different samples of participants, we found that fWHR was positively related to self-perceived dominance, again only in men. There was no relationship between fWHR and self-perceived prestige scores. Consistent with previous work, we also found that there was no sexual dimorphism in fWHR across all three studies. Together these results suggest that fWHR may be a reliable cue to dominant social behaviour in men.

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## 1. Introduction

In our everyday lives we use others' facial characteristics to make inferences about how they might behave. One facial trait that has been the focus of much recent research is facial width-to-height-ratio (fWHR). Differences in fWHR have been associated with reproductive success (Loehr & O'Hara, 2013), achievement drive (Lewis, Lefevre, & Bates, 2012), aggression (Carré & McCormick, 2008; Carré, McCormick, & Mondloch, 2009; Lefevre & Lewis, 2013; Trebicky, Havlíček, Roberts, Little, & Kleisner, 2013), cheating (Haselhuhn & Wong, 2012), trustworthiness (Stirrat & Perrett, 2010), and even with homerun performance in baseball (Tsujiyama & Banissy, 2013). Additionally, fWHR has been shown to be sexually dimorphic (Carré & McCormick, 2008; Weston, Friday, & Liò, 2007). However, in contrast to this seemingly consistent body of evidence, there are studies which have not found associations between fWHR and these variables. For example, multiple studies have suggested that there is no sexual dimorphism in fWHR (Gómez-Valdés et al., 2013; Lefevre et al., 2012; Özener, 2011) and that it is not related to aggression (Deaner, Goetz, Shattuck, & Schnotala, 2012; Gómez-Valdés et al., 2013; Özener, 2011).

This mixed pattern of findings suggests that more research is necessary to clarify the utility of fWHR as a perceptual cue to individual differences in behaviour. Furthermore, a potentially

important distinction which has not been readily made in this field is the difference between self-perceptions and other-perceptions of behavioural traits and their association with fWHR. What a person thinks about themselves might differ from how others perceive them. The aforementioned behaviours such as aggression, achievement drive, and cheating can be encompassed by the overarching trait of 'dominance' (Cheng, Tracy, Foulsham, Kingstone, & Henrich, 2013). However, only one study to our knowledge, has looked at fWHR and self-perceived dominance, and no association was found between these two variables (Carré & McCormick, 2008). A second, very recent study by Geniole, Keyes, Carré, and McCormick (2014) found that men with higher fWHR score higher on the psychopathic trait of 'fearless dominance' (encompassing low anxiety, fearlessness, and social influence); however as this trait suggests, it contains factors not only attributed to dominance/influence but other, more indirectly related concepts including fearlessness and low anxiety. Other work by Haselhuhn and Wong (2012) has found that men with higher fWHRs feel more powerful in their everyday lives and that this sense of power positively related to their unethical behaviour. Although power and dominance are distinct constructs, it is likely that they may be related, suggesting that fWHR may also be positively associated with dominance in men.

In our research we aimed to extend the above findings for the concept of 'dominance' by conducting three separate studies examining three questions: (A) is other-perceived dominance associated with fWHR?; (B) is self-perceived dominance (using 2 different self-report scales) associated with fWHR?; and (C) is fWHR sexually dimorphic?

\* Corresponding author. Tel.: +44 01786 466375.

E-mail address: [v.r.mileva@stir.ac.uk](mailto:v.r.mileva@stir.ac.uk) (V.R. Mileva).

## 2. Study 1

### 2.1. Methods

#### 2.1.1. Participants

100 (50 female, mean age  $\pm$  SE: 20.6  $\pm$  0.27) undergraduate university students were photographed with a neutral expression.

#### 2.1.2. Ratings

Faces were then rated for dominance by a set of online participants (9 female, 10 male, mean age  $\pm$  SE: 26.4  $\pm$  0.99) with reports made on a 1–7 point Likert scale with 1 being 'low' and 7 being 'high' in dominance. Images were shown in a random order.

#### 2.1.3. Measurements

Using the program ImageJ (Rasband, W.S., NIH, <http://imagej.nih.gov/ij/>) fWHR was calculated as specified in previous literature (Carré & McCormick, 2008; Carré et al., 2009). Briefly, the distance between the right and left zygions was used to measure width, and the distance between the brows and upper lip were used to measure height. This process was performed twice per face and the mean of both scores was used in subsequent analyses. An independent researcher coded 5 of the faces and inter-rater reliability was high:  $r(3) = .84$ .

### 2.2. Results and discussion

We first conducted a hierarchical regression to test the main effects of gender and fWHR, and the interaction term, on other-perceived dominance scores. This overall model was significant  $F(2, 97) = 3.94, p = .02$  and there was a significant main effect of participant sex ( $t = 2.41, p = .02$ ) but not of fWHR ( $t = 1.44, p = .16$ ), on other-perceived dominance scores. Given the overall effect, we proceeded to conduct correlational analyses for men and women separately.

There was no correlation between fWHR and other-perceived dominance scores in female participants,  $r(48) = -.11, p = .45$ , however these variables were significantly positively correlated in male participants,  $r(48) = .34, p = .02$  (Fig. 1). Independent samples t-tests revealed that there were no significant differences in fWHR between the sexes,  $t(98) = 0.06, p = .95, r = .01$ , but there was a difference in other-perceived dominance  $t(98) = 2.40, p = .02, r = .24$  (Table 1). These results suggest other-perceived dominance is related to fWHR in men, and in the following studies we explored whether self-perceived dominance was also related to fWHR.

## 3. Study 2

### 3.1. Methods

#### 3.1.1. Participants

Sixty (29 female; mean age  $\pm$  SE: 21.9  $\pm$  0.92) undergraduate students participated for course credit, or monetary reimbursement.

#### 3.1.2. Procedure

Participants posed for a 2D face photograph with a neutral expression. Subsequently, they were asked to complete a standard demographic form. Finally participants answered a short self-perceived dominance questionnaire (modified from IPIP; <http://ipip.ori.org/ipip/>, (Goldberg, 1999)). This modified version of the dominance questionnaire contained all 11 statements included in the original with the addition of an extra statement: 'I get my own way', to make 12 statements in total. Additionally, in the original questionnaire 10 out of the 11 statements were positively scored while in our modified version every second statement had the wording altered such that it could be negatively scored (i.e. from 'I try to outdo others' to 'I do not try to outdo others'), leading to 6 positively- and 6 negatively-scored statements. This was done to prevent acquiescence bias. Each statement was rated on a 5-point Likert scale with 1 being 'very inaccurate' and 5 being 'very accurate' (Chronbach's Alpha = 0.64). To calculate the dominance score for each participant we added all positively-scored statements and subtracted all negatively-scored statements, yielding a dominance score that could range from +24 to -24.

#### 3.1.3. Measurements

fWHR was calculated as described above on two separate occasions, these two scores were averaged, and the mean was used for analysis. An independent researcher coded 5 of the faces and inter-rater reliability was high:  $r(3) = .97$ .

### 3.2. Results and discussion

We began by conducting a hierarchical regression to test the



female fWHR relates to any other behavioural traits apart from dominance. The lack of relationship between fWHR and dominance in women across our three studies is consistent with the aforementioned work by Haselhuhn and Wong (2012). These authors found that men, but not women, with higher fWHRs feel more powerful in their everyday lives and that this sense of power positively related to their unethical behaviour.

In sum, we demonstrated that male other- and self-perceptions of dominance relate to their fWHR. In addition, we provide further evidence that fWHR is not a sexually dimorphic trait. These findings highlight the potentially important role of fWHR in elucidating our understanding of individual differences in human dominance behaviour.

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