FOCAL LENGTH INFLUENCES FACIAL WIDTH-TO-HEIGHT RATIO

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Growing body of research suggests link between facial Width-to-Height Ratio (bizygomatic width divided by upper facial height; fWHR) and a wide range of assessed or observed characteristics and behaviours(1,2). However, these results are rather inconsistent and recent meta-analysis showed only weak effect(3). fWHR studies are predominantly based on measurements taken from photographs downloaded from free access sources(4) or taken for purpose of a certain study(5). The methodology of downloaded photographs is usually unknown and presumably inconstant. Therefor, photograph acquisition is affected by many factors and might be biased by head tilt(6) or inconsistent photographing methods potentially increasing chance of biased results. Here we conducted a study to test the influence of different focal lengths on fWHR.

DOES DIFFERENT CAMERA FOCAL LENGTH INFLUENCES FWHR?

MATERIAL & METHODS

- 23 male participants (øage=23.8, SD=4.4)
- 22 female participants (øage=22.9, SD=4.4)
- 3 portrait images with full-frame focal lengths equivalents of 50 mm, 85 mm, 105 mm
- DSLR Nikon D90 (APS-C) & Nikon AF-S DX Zoom Nikkor 18-135 mm f/3.5-5.6 G IF-ED
- Exposure at F8, 1/100s, ISO 100; two lights setup with reflective umbrellas on grey seamless background
- Bizygomatic width divided by distance between the upper lip and brow measured by two researchers

DISCUSSION

Here we provide evidence that method of photographs acquisition affects fWHR in both males and females (stronger effect in males) with smaller facial Width-to-Height Ratio for faces captured with shorter focal lengths. Changes of facial dimensions are presumably result of different levels of perspective distortions produced by the focal lengths used. The faces captured with shorter focal length appear overall rounder and facial traits closer to camera bigger due to the vertically oblong shape of the human head. Our results suggest that methodology of photograph acquisition affects resulting product and in turn might be at least party responsible for contradictory evidence (e. g. falsely negative results).

RESULTS

Fig. 1: *Repeated measures ANOVA showed fWHR in females being significantly different between focal lengths ($F_{2,42} = 120.5$, $p < 0.001$, $\eta^2 = 0.85$). Post Hoc tests revealed significant differences between 50 mm and 85 mm ($p < 0.001$, $d = 3.45$) and 50 mm and 105 mm ($p < 0.001$, $d = 3.6$), but not between 85 mm and 105 mm. Error bars represent 95% CI.*

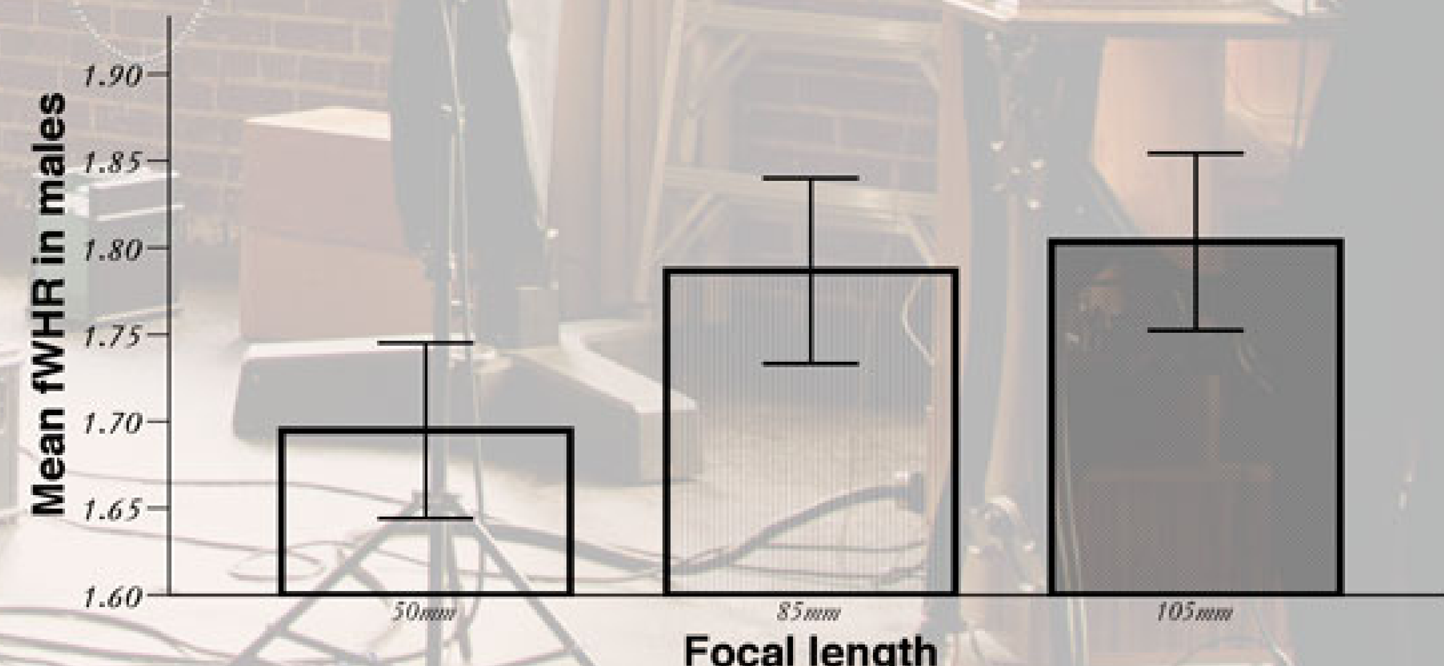

Fig. 2: *Repeated measures ANOVA showed fWHR in males being significantly different between focal lengths ($F_{2,44} = 176.4$, $p < 0.001$, $\eta^2 = 0.89$). Post Hoc tests revealed significant differences between 50 mm and 85 mm ($p < 0.001$, $d = 3.68$) and 50 mm and 105 mm ($p < 0.001$, $d = 4.41$), and 85 mm and 105 mm ($p = 0.016$, $d = 0.63$). Error bars represent 95% CI.*

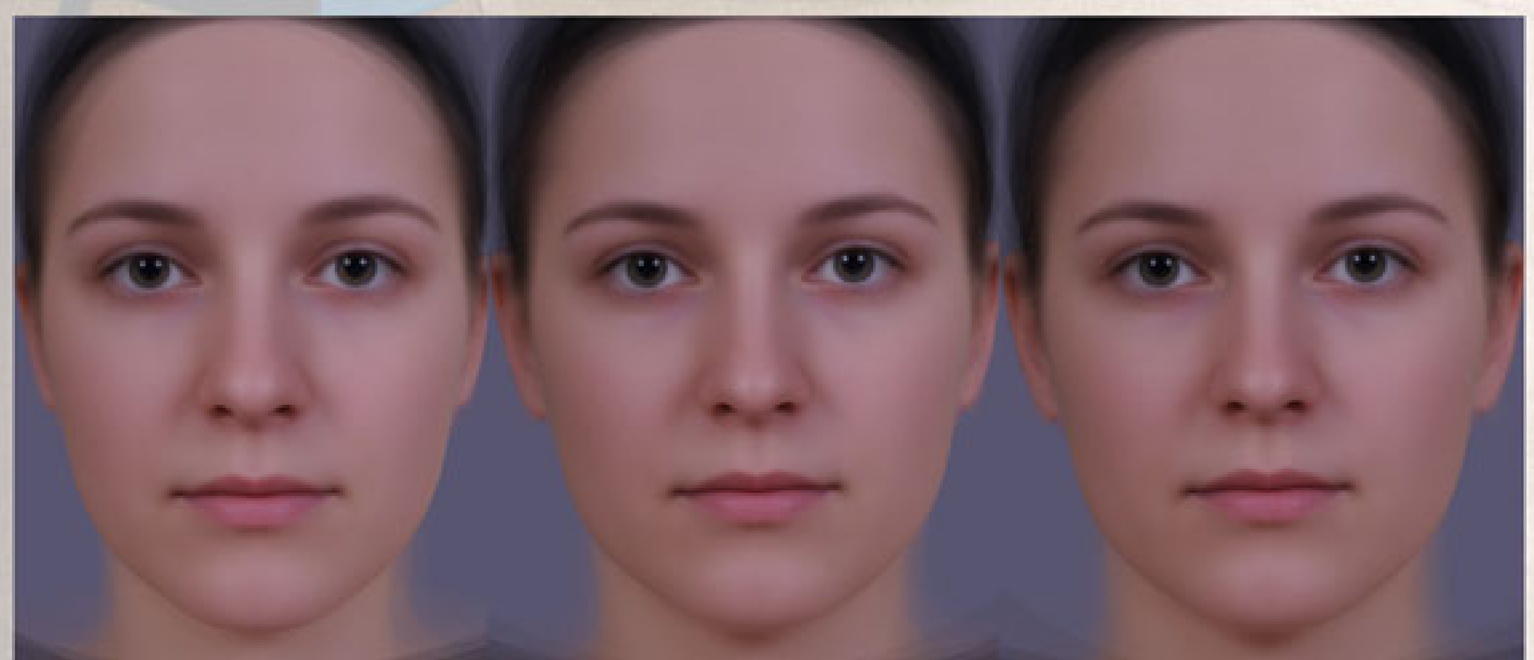

Fig. 3: *Averages of female faces captured with 50mm, 85 mm & 105 mm focal lengths.*

Fig. 4: *Averages of male faces captured with 50mm, 85 mm & 105 mm focal lengths.*

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