



Fearless dominance mediates the relationship between the facial width-to-height ratio and willingness to cheat



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ABSTRACT

The facial width-to-height ratio (fWHR) is associated with a range of behaviours in men, but little is known about the underlying psychological mechanisms. We tested whether psychopathic personality traits were related to fWHR and mediated the link between this metric and cheating behaviour. Participants (146 men, 76 women) completed the Psychopathic Personality Inventory-Revised and rolled dice to determine the number of ballots allowed for entry into a lottery for a cash prize. Men's willingness to cheat (entering more ballots than permitted) and their extent of cheating (number of additional ballots) was associated positively with fearless dominance and fWHR. Further, in men, fearless dominance was correlated with fWHR and mediated the relationship between fWHR and willingness to cheat, but not the extent of cheating. In women, there were no differences in fWHR or in personality traits between cheaters and non-cheaters. Psychopathic personality traits may thus underlie some fWHR-behaviour relationships in men.

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1. Introduction

The facial width-to-height ratio (fWHR; bizygomatic width divided by upper-face height), first described by Weston, Friday, and Liò (2007), has garnered much attention because of its association with a cluster of behavioural tendencies in men, but not in women. For example, men with larger face ratios were more aggressive on a laboratory aggression measure than were men with smaller face ratios (Carré & McCormick, 2008) and violent !Kung San men of Namibia had wider faces than those who were non-violent (Christiansen & Winkler, 1992). Amygdala activation, which predicts aggression in clinical populations (reviewed in Coccaro, Sripada, Yanowitch, & Phan, 2011), shared stronger associations with self-reported aggression in men with larger than with smaller face ratios (Carré, Murphy, & Hariri, 2013). Men with larger face ratios were also more likely to exploit the trust of others for personal gain (Stirrat & Perrett, 2010, 2012), endorse prejudicial beliefs (Hehman, Leitner, Deegan, & Gaertner, 2013), use explicit deception, and cheat in a lottery for a cash prize (Haselhuhn & Wong, 2012) than were men with smaller face ratios; these rela-

tionships were absent for women. Further, elite hockey players with larger face ratios had more penalty minutes per game (e.g., slashing, elbowing) than those with smaller ratios (Carré & McCormick, 2008). Although this association was only marginally significant in a larger sample of players ($p = 0.057$; Deaner, Goetz, Shattuck, & Schnotala, 2012), it appears to be moderated such that it is stronger among men who are lower in social status (Goetz et al., in press).

Any relationship between fWHR and such antisocial behaviour likely involves psychological mechanisms. Nevertheless, we have not found relationships between fWHR and broad domains of personality (e.g., such as the “big five” personality traits) (unpublished observations). Targeting specific personality traits rather than broad dimensions may be more fruitful. One study reported a correlation between fWHR and self-ratings of psychological “sense of power” in men, and that sense of power mediated the relationship between fWHR and cheating (Haselhuhn & Wong, 2012). The “sense of power” scale (Anderson & Galinsky, 2006), however, has not received the extensive psychometric analyses conducted for other questionnaires. Further, rather than directly measure cheating, Haselhuhn and Wong (2012) asked participants (50 men, 53 women) to report dice roll values (which were exchangeable for lottery ballots). Men, but not women, with high fWHRs reported higher dice rolls than those with low fWHRs, which the researchers concluded indicated cheating. Thus, cheaters and

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non-cheaters could not be directly compared to determine the true effect size. To address this limitation, we measured cheating directly in a larger sample (146 men and 76 women). We also used a measure of targeted personality traits that may better account for variability in fWHR and in cheating behaviour (and in antisocial behaviour, more generally). We measured psychopathic personality traits because of their robust association with antisocial behaviour in clinical and community samples (reviewed in [Leistico, Salekin, DeCoster, & Rogers, 2008](#); [Reidy, Shelley-Tremblay, & Lilienfeld, 2011](#)).

We used the well-validated Psychopathic Personality Inventory-Revised (PPI-R; [Lilienfeld & Widows, 2005](#)), which assesses multiple personality traits relevant to psychopathy that load onto three factors: fearless dominance (low anxiety/stress, fearlessness, and high social dominance and influence), self-centred impulsivity (tendency to exploit others and to blame others for personal failures, and impulsivity), and coldheartedness (tendency to be apathetic, guiltless, and callous). We hypothesized that fearless dominance would be most relevant to cheating on the basis that it predicted antisocial behaviour (self-benefiting/other-costing behaviour) in versions of a Dictator game ([Geniole, Busseri, & McCormick, in press](#)) and because this factor contains items similar to the “sense of power” scale (e.g., fearless dominance: I am good at getting people to do favors for me, I often end up being the leader of a group, I have an easy time standing up for my rights; sense of power: I can get others to do what I want; If I want to, I get to make the decisions; My ideas and opinions are rarely ignored). Nevertheless, fearless dominance is distinct from sense of power in that it includes items that assess fearlessness and stress immunity. These characteristics may increase cheating by reducing the fears associated with being identified as a cheater. Furthermore, fearless dominance was related positively to achievement drive ([Benning, Patrick, Hicks, Blonigen, & Krueger, 2003](#)) and sensation seeking (reviewed in [Poythress & Hall, 2011](#)), traits that promote cheating (e.g., [DeAndrea, Carpenter, Shulman, & Levine, 2009](#); [Williams, Nathanson, & Paulhus, 2010](#)). Therefore, we predicted that fWHR in men would be associated with cheating and psychopathic personality traits (specifically fearless dominance), that cheaters would be higher in fearless dominance than non-cheaters, and that the relationship between fWHR and cheating would be mediated by fearless dominance. We examined relationships among women, but predicted that the associations between fWHR, cheating, and personality would be specific to men.

2. Methods

2.1. Participants

Procedures were approved by (the Brock University and Wayne State University) Research Ethics Boards. Two-hundred twenty-three undergraduates were recruited through online research pools at both institutions (146 men and 77 women, $M_{\text{age}} = 20.28$, $SD_{\text{age}} = 2.79$, 67% White, 5% Asian, 11% Black, 17% other) and consented to the procedures of the study. One participant was removed because her hijab limited facial measurements.

2.2. Measure of psychopathic personality traits

The 154 item Psychopathic Personality Inventory – Revised (PPI-R; [Lilienfeld & Widows, 2005](#)) includes eight content scales subsumed by three factors: Fearless Dominance, Self-Centred Impulsivity, and Coldheartedness (described in Section 1). The factors are internally consistent (Cronbach's $\alpha \geq .78$ for each factor scale), possess high test–retest reliability ($r_s \geq .82$; [Lilienfeld & Widows, 2005](#)), and are correlated with other self-report measures

of psychopathic personality traits ([Marcus, Fulton, & Edens, 2012](#)). In the current sample, Fearless Dominance ($\alpha = .91$), Self-Centred Impulsivity ($\alpha = .89$), and Coldheartedness ($\alpha = .80$) were also internally consistent. The PPI-R questionnaire was embedded into a set of unrelated tasks administered for a different study.

2.3. Measure of cheating

To measure cheating, we modified the dice rolling/lottery procedure of [Haselhuhn and Wong \(2012\)](#) in which the number of ballots a participant could enter into a lottery was determined by a dice roll. After completing the test battery, participants were given blank ballots, the lottery-box (into which ballots would be entered), a pen, and a printout of instructions: “(1) Go to www.random.org/dice; (2) Click ‘roll dice’ once. This will roll a pair of dice; (3) Add the numbers on each die together. This will equal the number of ballots you can enter into the raffle.”

Participants were told that because several participants were in different rooms, the researcher had to remain available in the hallway. This procedure provided the participant the opportunity to cheat (entering more ballots into the lottery-box than the value of the dice roll) “undetected”. Hidden software recorded participants’ computer activity during the dice rolling procedure.

2.4. Facial width-to-height ratio (fWHR)

After the lottery, participants went to the hallway to be photographed posed in a neutral facial expression for measurement of fWHR according to landmarks described in [Weston and colleagues \(2007\)](#) as in our previous studies (e.g., [Carré & McCormick, 2008](#)). Research assistants (blind to the hypotheses) measured the height (distance between lip and brow) and width (distance between left and right zygion) using ImageJ (NIH software). Inter-rater reliability was high for width, height, and the ratio of the face measures ($r_s > .87$).

2.5. Statistical analysis

To simplify interpretation of results, we conducted 2×2 analyses of variance to determine if fWHR or the three factors of psychopathy differed for men versus women and cheaters versus non-cheaters (point-biserial correlations among variables produce the same results). To determine whether fWHR was related to the psychopathic personality factors, we entered the three factors as simultaneous predictors of fWHR. Bootstrapped mediation analysis ([Preacher & Hayes, 2008](#)) also was conducted to determine if the relationship between fWHR and cheating was mediated by psychopathic personality factors. Although three cases were identified as influential on specific regression coefficients and as multivariate outliers, removal of these cases did not alter the results significantly. Thus, all cases were included in the analyses reported.

3. Results

3.1. fWHR and psychopathic personality traits as a function of sex and cheating

Men (13%) and women (20%) did not differ in the percent that cheated in the lottery, $\chi^2 = 1.74$, $p = 0.13$. A two-factor (Sex = men vs. women; Cheating = cheaters vs. non-cheaters) ANOVA on fearless dominance scores indicated a main effect of Sex (men > women: $F_{1,218} = 38.06$, $p < 0.001$) that was obviated by a significant interaction between Sex and Cheating ($F_{1,218} = 8.80$, $p < 0.01$; see [Fig. 1a](#)). Follow-up t-tests indicated that for men ($t_{144} = -2.55$,

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