Bad to the bone: facial structure predicts unethical behaviour

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Researchers spanning many scientific domains, including primatology, evolutionary biology and psychology, have sought to establish an evolutionary basis for morality. While researchers have identified social and cognitive adaptations that support ethical behaviour, a consensus has emerged that genetically determined *physical* traits are not reliable signals of unethical intentions or actions. Challenging this view, we show that genetically determined physical traits can serve as reliable predictors of unethical behaviour if they are also associated with positive signals in intersex and intrasex selection. Specifically, we identify a key physical attribute, the facial width-to-height ratio, which predicts unethical behaviour in men. Across two studies, we demonstrate that men with wider faces (relative to facial height) are more likely to explicitly deceive their counterparts in a negotiation, and are more willing to cheat in order to increase their financial gain. Importantly, we provide evidence that the link between facial metrics and unethical behaviour is mediated by a psychological sense of power. Our results demonstrate that static physical attributes can indeed serve as reliable cues of immoral action, and provide additional support for the view that evolutionary forces shape ethical judgement and behaviour.

Keywords: sexual selection; morality; face; sex differences

1. INTRODUCTION

In his classic novel *The Bad Seed*, William March [1] tells the story of a murderous genetic trait that is passed from generation to generation, leading to the ultimate conclusion that some people are just 'born evil'. This idea that nature plays a dominant role in determining moral and ethical behaviour is paralleled in a growing body of research examining the evolutionary origins of morality. For instance, research in animal cognition and comparative psychology has found that primates demonstrate a sense of justice in the allocation of collectively earned rewards [2,3], and can discern intentional from accidental behaviour, a key aspect in making ethical judgements [4]. Evolutionary psychologists have taken a different approach and looked for evidence of evolved moral characteristics in humans, arguing, for example, that we have adapted an innate ability to detect the unethical behaviour of others [5,6].

While this research has identified social and cognitive adaptations that shape moral judgement and behaviour, it has not adequately addressed the question of whether genetically determined *physical* characteristics relate to morality. Indeed, while some evidence exists that transitory facial cues (e.g. facial tension, posed smiling) are reliable signals of ethically questionable behaviour [7,8], the idea that persistent facial characteristics can predict unethical action has largely been dismissed out of hand. As Verplaetse *et al.* [8] argued, 'On theoretical grounds, it is unlikely that predictive cheater detection mechanisms could rely on permanent facial features revealed by neutral facial expressions' (p. 261). From an evolutionary perspective, reliable physical signals of unethical behaviour should eventually be selected out of the gene pool [7,9].

We propose that one exception to this rule of nature may be the case where physical associates of evolutionarily desirable characteristics (e.g. physical dominance) are highly correlated with other, less socially acceptable actions (e.g. cheating). More concretely, we posit that aggression, a trait that is positively associated with mate preference [10], will also be correlated with unethical behaviour. Thus, physical traits that have been selected as reliable signals of male dominance and aggression may also serve as reliable predictors of morally questionable actions. In this paper, we draw on recent research establishing a specific physical metric, the facial width-to-height ratio (WHR), as a signal of aggression in men, and we link this physical measure to unethical behaviour. For the first time, we show that persistent physical traits can indeed predict unethical actions.

(a) Facial width-to-height ratio

The facial WHR is a sexually dimorphic trait (with men having larger ratios than women) that is independent of body size and is argued to have evolutionary origins [11]. Consistent with the idea that evolutionary pressures account for this dimorphism, intrasex differences in facial WHRs have been linked to aggression in men, with greater facial WHRs associated with more aggressive behaviour [10,12]. For instance, men with greater facial WHRs are more likely to retaliate to perceived slights by others [10] and are more likely to act in their own self-interest, even if it means violating another's trust [13].

While this recent work has broadened our understanding of the behavioural correlates of facial WHR, less is known about the psychological underpinnings of these relationships. We propose that one reason for the aggression and self-interest demonstrated by men with higher facial WHRs [10,13] is that they feel more powerful. Individuals who feel powerful think and behave egocentrically

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(e.g. [14]), and power is often associated with aggressive behaviour (e.g. [15]).

In turn, we expect that the feelings of power held by men with relatively large facial WHRs will affect ethical judgement and behaviour. Individuals who feel powerful are more likely to act in their own self-interest and feel less constrained by social norms or concerns [16]. Additionally, a general sense of power has been linked directly to unethical behaviour, such as cheating [14].

Taken together, we predict that larger facial WHRs will be positively related to unethical behaviour in men. We expect that men with large facial WHRs will feel an elevated sense of power, which, in turn, will be associated with unethical behaviour.

(b) *Overview of experiments*
We tested our predictions in two studies examining two different forms of unethical behaviour: deception and cheating. In study 1, we measured participants' facial WHR and captured the degree to which they engaged in deception during a negotiation. We predicted that men would be more likely to engage in deception when they had larger facial WHRs. In study 2, we measured participants' facial WHRs as well as their general sense of power, and presented them with an opportunity to cheat for financial gain. We expected that men's facial WHR would predict the degree of cheating behaviour, and that this relationship would be mediated by feelings of power.

2. STUDY 1
We first tested our predictions in a negotiation context. Understanding ethical behaviour in negotiation is important because negotiations are both ubiquitous in everyday life [17] and a domain where unethical behaviours, including deception, are common and potentially harmful [18]. Our goal in study 1 was to examine how men's facial WHR predicts the use of deception in negotiation.

3. METHOD
(a) *Participants*
One hundred and ninety-two Masters of Business Administration students (96 dyads) participated in a negotiation as part of a classroom exercise. In the negotiation, participants were randomly assigned to play either a buyer or seller role. Buyers and sellers were then randomly paired into dyads.[1] The majority of our participants (59.9%, $n = 115$) were men, and composed the majority for both the buyer role (53.1%, $n = 51$) and the seller role (66.7%, $n = 64$). The sample was drawn from a population with an average age of 28.

(b) *Materials and procedure*
Participants received their negotiation materials one week before the negotiation. We used the Bullard Houses negotiation exercise [19] in which a seller is interested in selling a property to a buyer only if the buyer can guarantee that the property will be preserved, and the buyer is unwilling to make any guarantees. This exercise is characterized by a positive bargaining zone in terms of financial concerns, but a negative bargaining zone in terms of each party's underlying interests. Specifically, we instructed the seller not to sell the property unless they are certain that the property will not be used for commercial use. We informed buyers that if they purchased the property they

will certainly develop it for commercial use. Buyers were also informed that they could not reveal their specific intentions for the property (the planned construction of a hotel).

(i) *Deception*
Our interest in this study was whether the buyer explicitly misstated his or her intentions to the seller. The negotiation was conducted *via* email, both to eliminate any potential interactive effects of negotiators' facial structure, and to provide us with a negotiation transcript. Four coders independently evaluated the transcripts for whether the buyer explicitly deceived the seller. Transcripts were divided into two subsets, and each set was evaluated by two coders. Initial inter-rater agreement was adequate for both subsets of data (both $\kappa > 0.72$), and disagreements were resolved by a third coder. This measure represents our key dependent variable.

(ii) *Facial width-to-height ratio*
Buyers' facial ratios were collected from student photos downloaded from the online class roster. Following Carré *et al.* [12], we converted the photos to 8-bit grey scale and standardized the pictures to a height of 400 pixels. Two research assistants measured the width and height of each face using NIH IMAGEJ software. Inter-rater agreement was high for measurements of facial width ($r = 0.968$, $p < 0.001$) and height ($r = 0.965$, $p < 0.001$), as well as for the overall facial WHR ($r = 0.758$, $p < 0.001$).

4. RESULTS AND DISCUSSION
(a) *Preliminary analyses*
Explicit deception occurred in 18.8 per cent of the negotiations. A marginally greater proportion of men (25%, $n = 13$) than women (11%, $n = 5$) engaged in deception, $\chi^2(1, N = 96) = 3.25$, $p = 0.07$. Men (mean = 1.78, s.d. = 0.12, range: 1.48–1.98) had marginally greater facial ratios than did women (mean = 1.74, s.d. = 0.12, range: 1.45–2.00), ($F_{1,94} = 3.36$, $p = 0.07$). The relationships among sex, facial WHR and deception are depicted in figure 1.

(b) *Sex, facial width-to-height ratio and deception*
To test our primary prediction, we conducted a logistic regression with buyer deception as the dependent variable, and buyer sex and buyer facial WHR as independent variables. In support of our hypothesis, a significant interaction between buyer sex and buyer facial WHR emerged, $b = 5.88$, SE = 2.69, Wald $\chi^2(1, N = 96) = 4.77$, $p = 0.03$. To better understand this interaction, we conducted separate logistic regressions for men and women. Consistent with our thesis, men's facial WHR was significantly related to the use of deception ($b = 7.17$, s.e. = 3.46, Wald $\chi^2(1, N = 51) = 4.29$, $p = 0.04$), while women's facial WHR was not related to deception ($b = -4.58$, s.e. = 4.12, Wald $\chi^2(1, N = 45) = 1.24$, ns).

These results support our hypothesis that facial WHR predicts unethical behaviour in men. In a negotiation context, men's facial width, relative to facial height, predicted whether they engaged in deception. Stated differently, men with larger facial WHRs were more likely to explicitly deceive their negotiation counterparts.

While this study provides initial evidence of an interaction between facial ratios and sex in predicting unethical behaviour, there are two potential limitations of
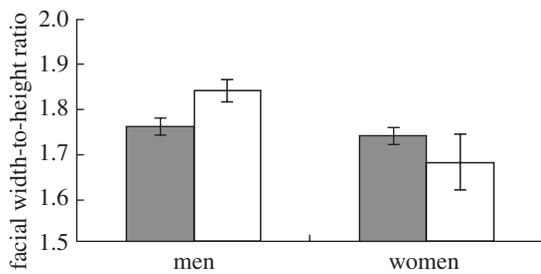
Figure 1. Study 1: mean facial WHR ($\pm$s.e.m.) of men and women separated by deception behaviour. Filled bars, no deception; unfilled bars, deception.

our data. First, while study 1 successfully established the relationship between facial WHR and unethical behaviour in men, the design of study 1 did not assess our proposed underlying mechanism: a psychological sense of power. Second, deception was relatively rare in this study, perhaps limiting our ability to determine whether the relationship between facial WHR and unethical behaviour differs for men and women. In the light of these potential limitations, we conducted a second study to gain additional support for the hypothesized relationship between men's facial WHR and unethical behaviour.

5. STUDY 2

The current study examines another form of unethical behaviour: cheating. We presented participants with an opportunity to cheat and unobtrusively gathered evidence of ethical or unethical behaviour. We hypothesized that men's facial WHR would predict the degree to which they cheated. In addition to extending our research to another type of unethical behaviour, we examined the psychological processes underlying the relationship between facial WHR and ethics. Specifically, we tested our prediction that the psychological experience of power mediates the relationship between facial WHR and cheating.

6. METHOD

(a) *Participants*

We recruited 123 undergraduate students to participate for course credit. Twenty participants failed to provide a photo appropriate for our facial WHR calculation, resulting in a sample of 103 participants. Our sample was 49 per cent male ($n = 50$) and 51 per cent female ($n = 53$). The sample was drawn from a population with an average age of 22.

(b) *Materials and procedure*

Participants completed an online survey containing our power measure among other unrelated questionnaires. Following the survey, we presented participants with an opportunity to cheat using the paradigm established by Lammers *et al.* [14]. Participants were given the chance to enter into a lottery for a $50 gift card as compensation for completing the survey. The number of times they would be entered into the lottery would be determined by a dice roll. Participants were directed to a website (random.org) that simulated the roll of two standard, six-sided dice. Participants were instructed to roll the dice once, sum the two dice together, and then enter this number into the survey. Of course, participants were free to enter any number

they chose. The dice roll was random and therefore logically unrelated to any personal characteristics. Thus, any systematic relationship between participants' characteristics and the number reported in the survey is indicative of cheating behaviour [14].

We expected that men with greater facial WHRs would report higher dice rolls. As the actual dice roll is completely random, any relationship between facial WHR and the reported rolls represents strong evidence that men with high facial WHRs are over-reporting the results of their roll (i.e. cheating). It is important to note that this paradigm allows us to capture cheating behaviour only indirectly. Indeed, our approach introduces potential noise to the data as, for example, men with smaller facial WHRs may legitimately roll and report higher dice totals. Thus, testing for cheating behaviour using this paradigm represents a conservative test of our hypotheses.

(i) *Power*

We measured power using a scale developed by Anderson & Galinsky [20]. The scale assesses agreement with eight statements such as 'I can get people to listen to what I say', and 'I think I have a great deal of power' (1 = disagree strongly, 7 = agree strongly). The scale demonstrated adequate reliability ($\alpha = 0.80$).

(ii) *Facial width-to-height ratio*

Participants' facial ratios were captured through photos submitted to an online class roster. A trained research assistant collected facial measurements using the procedures described in study 1.

7. RESULTS AND DISCUSSION

(a) *Preliminary analyses*

Means and standard deviations are presented in table 1. Consistent with study 1, men's facial WHR was marginally greater than women's facial WHR, $F_{1,101} = 3.07$, $p = 0.08$. Men and women did not differ in their overall sense of power, $F_{1,101} = 0.15$, n.s. With regard to our measure of cheating behaviour, the average dice roll reported across all participants was 7.76 (s.d. = 2.51). This reported dice roll was significantly greater than the average roll of seven expected by random chance ($t_{102} = 3.06$, $p = 0.003$) indicating that cheating occurred in this study. Both men ($t_{49} = 1.95$, $p = 0.05$) and women ($t_{52} = 2.34$, $p = 0.02$) reported dice rolls significantly higher than the roll expected by chance; the difference between men and women in cheating behaviour was not significant, $F_{1,101} = 0.14$, n.s.

(b) *Facial width-to-height ratio, power and cheating*

To test our hypothesis that men's facial WHR would relate to cheating behaviour, we regressed the reported dice roll on sex and facial WHR. This analysis revealed a significant interaction, $\beta = 2.11$, $t_{99} = 2.04$, $p = 0.04$. To understand this interaction, we conducted separate regressions for men and women (table 1). Consistent with our prediction, no significant relationship between facial WHR and cheating emerged for women ($\beta = -0.01$, $t_{51} = -0.04$, n.s.), while a significant positive relationship between facial WHR and cheating emerged for men, $\beta = 0.36$, $t_{48} = 2.69$, $p = 0.01$.

Table 1. Study 2: means, standard deviations and correlations between variables for men and women. Significant correlations ($p < 0.05$) are in boldface.

variable	mean	s.d.	min	max	1	2	3
men							
1 facial WHR	1.79	0.15	1.44	2.08	—		
2 power	5.40	0.69	4.00	7.00	**0.31**	—	
3 cheating (dice roll)	7.66	2.40	3.00	12.00	**0.36**	**0.41**	—
women							
1 facial WHR	1.73	0.21	1.21	2.31	—		
2 power	5.34	0.70	3.75	7.00	0.17	—	
3 cheating (dice roll)	7.85	2.64	2.00	12.00	−0.01	0.06	—

We next examined the psychological processes underlying the link between facial WHR and cheating for men by exploring the mediating role of power (figure 2). As expected, men's facial WHR was significantly related to power, $\beta = 0.31$, $t_{48} = 2.23$, $p = 0.03$. When cheating behaviour was simultaneously regressed on facial WHR and power, the effect of power was significant ($\beta = 0.33$, $t_{47} = 2.44$, $p = 0.02$), while the effect of facial WHR was only marginally significant, $\beta = 0.26$, $t_{47} = 1.94$, $p = 0.06$. To test the significance of this mediation, we conducted bias-corrected bootstrapping analyses with 5000 resamples [21]. This analysis revealed a significant indirect effect of facial WHR, mediated effect = 1.65, s.e. = 1.02, 95% CI = 0.14–4.26. As the confidence interval did not bridge zero, this analysis supports our conclusion that power mediated the relationship between facial WHR and cheating.

As we hypothesized, men's facial WHR predicted cheating behaviour. Men, but not women, with greater facial WHRs systematically reported higher dice rolls. As in previous research (e.g. [14]), this can be interpreted as clear evidence of cheating. Men's sense of power mediated this relationship. Facial WHR appears to be closely related to the psychological experience of power in men, and these feelings of power translated directly into less ethical behaviour. While the indirect nature of our cheating measure limits our ability to draw strong conclusions about cheating behaviour at the individual level, the results of this study (as well as those of study 1) suggest a robust relationship between facial WHR and unethical behaviour in men.

8. GENERAL DISCUSSION

Across two studies, we demonstrated that men's facial structure predicts unethical behaviour. For the first time, the current research shows that a persistent physical trait, the facial WHR, reliably predicts deception (study 1) and cheating (study 2). In addition, we identify the psychological underpinnings of the relationship between facial metrics and unethical action: the psychological experience of power. Men with greater facial WHRs felt more powerful, and this sense of power directly affected their ethical behaviour.

Two interesting sex differences emerged in our studies. First, men's facial WHR predicted unethical actions while women's facial WHR did not. These results are consistent with previous research demonstrating that only men's facial ratios are strong predictors of behaviour (e.g.
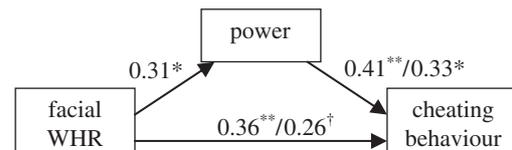

Figure 2. Study 2: mediation model. Coefficients are standardized βs. Numbers to the right of the slash represent the standardized β in the simultaneous regression analysis. Symbols: *$p < 0.05$; **$p < 0.01$; †$p < 0.10$.

[10,13]). By establishing psychological and behavioural correlates of facial WHR for men, this research collectively supports the idea that the sexual dimorphism in facial WHR is a result of selecting for greater facial WHRs in men, rather than smaller facial WHRs in women (cf. [11]). The second significant sex difference in our results is that power predicted unethical behaviour for men, while no relationship between power and ethics was present for women. Whereas recent research examining the links between power and morality (e.g. [14,22]) has not reported any sex differences, our results suggest that further examination of how men and women's moral judgements relate to power is warranted.

Our research makes a novel contribution to the growing literature exploring the evolutionary basis for moral behaviour. Challenging previous assumptions, we identify a stable physical trait that reliably predicts unethical behaviour. While some have hypothesized that genetically determined physical traits are unlikely to emerge as predictors of unethical behaviour (e.g. [8]), we show that persistent physical traits can indeed predict immoral actions if they are also associated with positive factors in intersexual and intrasexual selection.

The current research also makes important contributions to the growing body of research examining the behavioural correlates of the facial WHR. First, our work complements the research of Stirrat & Perrett [13], who demonstrated that men with higher facial WHRs were more likely to exploit a counterpart's trust in an economic game. While the paradigm used in this previous research makes it difficult to draw strong conclusions about the ethicality of men's behaviour (i.e. trust violators acted rationally from an economic perspective [23] and did not deceive or mislead the trusting party), our research supports the position that trust violators may have actively and intentionally taken advantage of others to further their own self-interest.

Second, we contribute to the literature on facial structure and behaviour by introducing a key psychological

mechanism, the general sense of power, which not only explains the link between facial WHR and ethics, but may also underlie the relationships among facial WHR, aggression and self-interest described in previous research [10,12,13]. The relationship between facial WHR and power should be explored further in future research. Given the theorized links between power and optimism, goal-directed behaviour and leadership ability [24], it may be the case that facial WHR is a physical predictor of these important psychological and behavioural outcomes as well.

While we have adopted the perspective that biological factors underlie differences in facial WHR, power and unethical behaviour, it is important to recognize that other developmental processes may play an important part in forming these links as well. For example, Zebrowitz and colleagues (e.g. [25–27]) have proposed that observed links between physical characteristics and behaviours may be due to a complex interplay in which physical traits affect the social environment, which in turn elicits certain behaviours. In the current context, one possibility is that men with greater facial WHRs are perceived and treated by others in ways that encourage unethical action (i.e. a self-fulfilling prophecy). Recent research (e.g. [13,28]) has demonstrated that observers view men's facial WHR as a signal of aggression and untrustworthiness, and adjust their behaviour as a result of these perceptions. If, for instance, observers respond to facial cues by deferring to men whom they perceive to be aggressive based on their facial WHR, these men may find it easier to take advantage of others. Similarly, if men with greater facial WHRs are treated in ways that make them feel more powerful, this may foster a psychological sense of power which then affects ethical judgement and behaviour.[2] Thus, future research should carefully examine the ways in which facial morphology relates to facial perceptions, and the effect of this relationship on psychological traits and ethical behaviour.

In conclusion, our research provides a new perspective to the study of the evolutionary foundations of morality by identifying a genetically determined physical predictor of unethical behaviour. We demonstrate that men with wider faces (relative to facial height) feel more powerful, and these feelings of power lead directly to less ethical behaviour, including lying and cheating. Perhaps some men truly are bad to the bone.

ENDNOTES

[1] Negotiating dyads included both mixed-sex and same-sex compositions. The pattern and significance of our results hold when controlling for dyad composition.

[2] We thank an anonymous reviewer for this suggestion.

REFERENCES

1 March, W. 1954 *The bad seed.* New York, NY: Rinehart & Company.

2 de Waal, F. B. M. 2006 Joint ventures require joint payoffs: fairness among primates. *Soc. Res.* **73**, 349–364.

3 Mendres, K. A. & de Waal, F. B. M. 2000 Capuchins do cooperate: the advantage of an intuitive task. *Anim. Behav.* **60**, 523–529. (doi:10.1006/anbe.2000.1512)

4 Hauser, M., Glynn, D. & Wood, J. 2007 Rhesus monkeys correctly read the goal-relevant gestures of a human agent. *Proc. R. Soc. B* **274**, 1913–1918. (doi:10.1098/rspb.2007.0586)

5 Cosmides, L. 1989 The logic of social exchange: has natural selection shaped how humans reason? Studies in the Wason selection task. *Cognition* **31**, 187–276. (doi:10.1016/0010-0277(89)90023-1)

6 Cosmides, L. & Tooby, J. 1992 Cognitive adaptations for social exchange. In *The adapted mind: evolutionary psychology and the generation of culture* (eds J. H. Barkow, L. Cosmides & J. Tooby), pp. 163–228. New York, NY: Oxford University Press.

7 Brown, W. M. & Moore, C. 2002 Smile asymmetries and reputation as reliable indicators of likelihood to cooperate: an evolutionary approach. *Adv. Psychol. Res.* **11**, 59–78.

8 Verplaetse, J., Vanneste, S. & Braeckman, J. 2007 You can judge a book by its cover: the sequel. A kernel of truth in predictive cheating detection. *Evol. Hum. Behav.* **28**, 260–271. (doi:10.1016/j.evolhumbehav.2007.04.006)

9 Trivers, R. L. 1985 *Social evolution.* Menlo Park, CA: Benjamin/Cummings.

10 Carré, J. M. & McCormick, C. M. 2008 In your face: facial metrics predict aggressive behaviour in the laboratory and in varsity and professional hockey players. *Proc. R. Soc. B* **275**, 2651–2656. (doi:10.1098/rspb.2008.0873)

11 Weston, E. M., Friday, A. E. & Liò, P. 2007 Biometric evidence that sexual selection has shaped the hominin face. *PLoS ONE* **2**, e710. (doi:10.1371/journal.pone.0000710)

12 Carré, J. M., McCormick, C. M. & Mondloch, C. J. 2009 Facial structure is a reliable cue of aggressive behaviour. *Psychol. Sci.* **20**, 1194–1198. (doi:10.1111/j.1467-9280.2009.02423.x)

13 Stirrat, M. & Perrett, D. I. 2010 Valid facial cues to cooperation and trust: male facial width and trustworthiness. *Psychol. Sci.* **21**, 349–354. (doi:10.1177/0956797610362647)

14 Lammers, J., Stapel, D. A. & Galinsky, A. D. 2010 Power increases hypocrisy: moralizing in reasoning, immorality in behaviour. *Psychol. Sci.* **21**, 737–744. (doi:10.1177/0956797610368810)

15 Keltner, D., Gruenfeld, D. H. & Anderson, C. 2003 Power, approach and inhibition. *Psychol. Rev.* **110**, 265–284. (doi:10.1037/0033-295X.110.2.265)

16 Galinsky, A. D., Magee, J. C., Gruenfeld, D. H., Whitson, J. & Liljenquist, K. A. 2008 Social power reduces the strength of the situation: Implications for creativity, conformity, and dissonance. *J. Pers. Soc. Psychol.* **95**, 1450–1466. (doi:10.1037/a0012633)

17 Thompson, L. 2005 *The mind and heart of the negotiator*, 3rd edn. Upper Saddle River, NJ: Pearson Prentice Hall.

18 Schweitzer, M. 2001 Deception in negotiations. In *Wharton on making decisions* (eds S. Hoch & H. Kunreuther). New York, NY: Wiley.

19 Karp, R., Gold, D. & Tan, M. 2006 *Bullard Houses* (*Dispute resolution exercise*). Cambridge, MA: Harvard University, Harvard Law School, Program on Negotiation.

20 Anderson, C. & Galinsky, A. D. 2006 Power, optimism, and risk-taking. *Eur. J. Soc. Psychol.* **36**, 511–536. (doi:10.1002/ejsp.324)

21 Preacher, K. J. & Hayes, A. F. 2008 Asymptotic and resampling strategies for assessing and comparing indirect effects in multiple mediator models. *Behav. Res. Meth.* **40**, 879–891. (doi:10.3758/BRM.40.3.879)

22 Lammers, J. & Stapel, D. A. 2009 How power influences moral thinking. *J. Pers. Soc. Psychol.* **97**, 279–289. (doi:10.1037/a0015437)

23 Berg, J., Dickhaut, J. & McCabe, K. 1995 Trust, reciprocity, and social history. *Games Econ. Behav.* **10**, 122–142. (doi:10.1006/game.1995.1027)

24 Galinsky, A. D., Jordan, J. & Sivanathan, N. 2008 Harnessing power to capture leadership. In *Leadership at the crossroads: Leadership and psychology*, vol. 1 (eds C. L. Hoyt, G. R. Goethals & D. R. Forsyth). Westport, CT: Praeger.

25 Zebrowitz, L. A., Andreoletti, C., Collins, M. A., Lee, S. Y. & Blumenthal, J. 1998 Bright, bad, babyfaced boys: appearance stereotypes do not always yield self-fulfilling prophecy effects. *J. Pers. Soc. Psychol.* **75**, 1300–1320. (doi:10.1037/0022-3514.75.5.1300)

26 Zebrowitz, L. A. & Collins, M. A. 1997 Accurate social perception at zero acquaintance: The affordances of a Gibsonian approach. *Pers. Soc. Psychol. Rev.* **1**, 204–223. (doi:10.1207/s15327957pspr0103_2)

27 Zebrowitz, L. A., Voinescu, L. & Collins, M. 1996 Wide-eyed and crooked-faced: determinants of perceived and real honesty across the life span. *Pers. Soc. Psychol. Bull.* **22**, 1258–1269. (doi:10.1177/014616729622 12006)

28 Carré, J. M., Morrissey, M. D., Mondloch, C. J. & McCormick, C. M. 2010 Estimating aggression from emotionally neutral faces: which facial cues are diagnostic? *Perception* **39**, 356–377. (doi:10.1068/p6543)