Trustworthy but not lust-worthy: context-specific effects of facial resemblance

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If humans are sensitive to the costs and benefits of favouring kin in different circumstances, a strong prediction is that cues of relatedness will have a positive effect on prosocial feelings, but a negative effect on sexual attraction. Indeed, positive effects of facial resemblance (a potential cue of kinship) have been demonstrated in prosocial contexts. Alternatively, such effects may be owing to a general preference for familiar stimuli. Here, I show that subtly manipulated images of other-sex faces were judged as more trustworthy by the participants they were made to resemble than by control participants. In contrast, the effects of resemblance on attractiveness were significantly lower. In the context of a long-term relationship, where both prosocial regard and sexual appeal are important criteria, facial resemblance had no effect. In the context of a short-term relationship, where sexual appeal is the dominant criterion, facial resemblance decreased attractiveness. The results provide evidence against explanations implicating a general preference for familiar-looking stimuli and suggest instead that facial resemblance is a kinship cue to which humans modulate responses in a context-sensitive manner.

Keywords: Kin recognition; facial self-resemblance; trustworthiness; attractiveness; inbreeding avoidance; inclusive fitness

Cues of kinship are predicted to increase non-sexual prosocial regard owing to the benefits to inclusive fitness (Hamilton 1964) while decreasing sexual desirability owing to the costs of inbreeding (Bittles & Neel 1994). Consistent with this hypothesis, experimentally produced facial resemblance, a potential cue of kinship, has been shown to increase trusting behaviour (DeBruine 2002), self-reported preference for children (Platek *et al.* 2002, 2003; DeBruine 2004*a*) and the attractiveness of same-sex faces (DeBruine 2004*b*). Contrary to numerous findings that romantic partners tend to resemble one another (Griffths & Kunz 1973; Zajonc *et al.* 1987; Hinsz 1989; Bereczkei *et al.* 2002; Bereczkei *et al.* 2004), experimentally produced facial resemblance does not significantly increase the attractiveness of other-sex faces (Penton-Voak *et al.* 1999; DeBruine 2004*a,b*).

Preferences for facial resemblance may be by-products of a more general preference for familiar or average stimuli. Faces, as well as other objects, are judged as more attractive if they have been previously seen (Zajonc 1968; Bornstein 1989). This finding extends to composites of previously seen faces (Rhodes *et al.* 2001) and may explain the attractiveness of average faces (Halberstadt & Rhodes 2000; Rhodes *et al.* 2003). The perceptual system is influenced by individual faces that are experienced (Blanz *et al.* 2000; Leopold *et al.* 2001; Webster *et al.* 2004) and evidence suggests this includes one's own face. Both male and female faces were judged as more average when they were transformed to resemble a participant's own face than when they were transformed to resemble other participants' faces (DeBruine 2004*b*), supporting

the existence of a perceptual prototype that is biased towards one's own face relative to unfamiliar faces.

The current study tests the nature of preferences for self-resemblance by assessing responses to computer manipulated facial resemblance in explicitly prosocial and sexual contexts. If humans use facial resemblance as a cue of kinship and are sensitive to the costs and benefits of favouring kin in different circumstances, facial resemblance should have a positive effect on prosocial attributions but a negative effect on sexual attraction. Sexual attractiveness can be further assessed in the contexts of short-term and long-term relationships (Little *et al.* 2002; Penton-Voak *et al.* 2003). Heritable benefits are, in theory, more important in short-term mates (Gangestad & Simson 2000) and preferences for putative cues to genetic quality (i.e. facial masculinity) have been found to be stronger in short-term than long-term contexts (Johnston *et al.* 2001; Little *et al.* 2002; Penton-Voak *et al.* 2003). In addition, direct benefits associated with long-term partnerships between kin have been found to offset the genetic costs of inbreeding (Bittles *et al.* 2002). This leads to the prediction that cues of relatedness such as facial resemblance will be more aversive in a short-term context than a long-term context. However, if responses to facial resemblance are non-adaptive by-products of prototype formation, then facial resemblance, like averageness, should increase preferences in all prosocial and sexual contexts.

1. METHODS

(a) *Participants*

Participants were 66 male and 78 female undergraduate students enrolled in an introductory psychology course (mean age = 19.1 years, s.d. = 2.3). Participants were of varying ethnic backgrounds, but were divided for the

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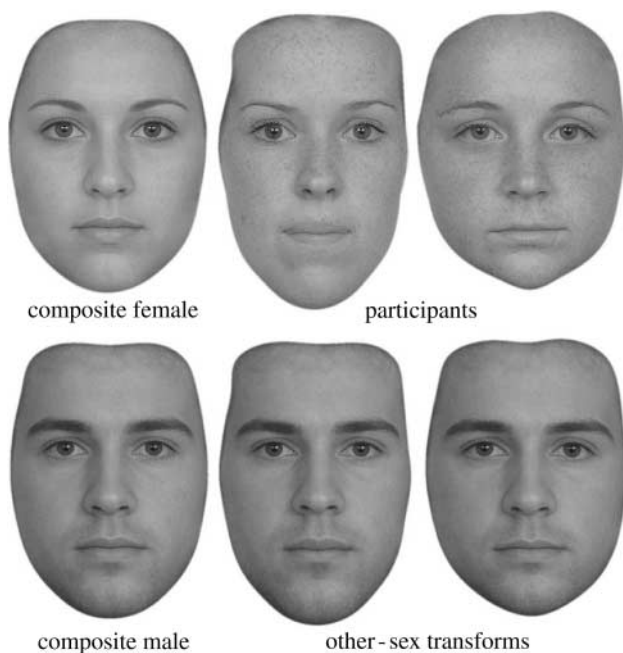
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Figure 1. Other-sex transforms were made by applying 50% of the shape difference between a participant's face and the same-sex composite face to an other-sex composite face. Transforms retained 100% of the colour information from the other-sex composite face. See Electronic Appendix A for a high resolution colour version of this image.

purposes of transforming faces into the broad phenotypic categories of African/Afro-Carriban (6 male, 0 female), East Asian (13 male, 17 female), European (31 male, 52 female) and West Asian (16 male, 9 female).

Participants were grouped into 18 testing units of four to nine persons of the same sex and same phenotypic category who acted as controls for each other. All participants in a testing unit viewed the same set of nine images, which included one self-resembling face for each participant in the testing unit. For the nine testing units with fewer than nine participants (6 with 8 participants and 1 each with 6, 5 and 4 participants), images of unknown persons of the same sex and same phenotypic category as the participants were added to equate the number of images seen by each participant.

(b) *Stimuli*
Stimuli were constructed in a manner identical to DeBruine 2004b using computer graphic methods described in detail in Tiddeman *et al.* (2001). In brief, composite faces were created by averaging the shape and colour of 20 individual images (of participants in a previous experiment) for each combination of sex and phenotypic category. Each participant's image was used to transform the other-sex composite face of the same phenotypic category. The shape of each face was delineated using 179 facial landmarks. Transforms were made by calculating the shape differences between the participant's face and the same-sex composite face and applying 50% of this difference to the other-sex composite face (figure 1). Resemblance was subtle and at debriefing no participants reported correctly detecting the nature of the manipulation.

(c) *Procedure*
Participants made two-alternative forced-choice decisions between all 36 possible pairs of the nine faces in each testing

unit for each question block. Each participant thus made eight decisions for each of the nine faces, including one self-resembling face. The order of faces was randomized and then presented in an optimal manner for two-alternative forced choice tasks (Ross 1934), whereby each image was shown equally often in each position and the presentation of identical stimuli was maximally spaced.

The same faces were presented for each of the three question blocks, which were presented in randomized order. Specifically, the three instructions presented were: (i) 'click on the face you find more trustworthy', (ii) 'click on the face you find more attractive for a long-term relationship' and (iii) 'click on the face you find more attractive for a short-term relationship'. Long-term and short-term relationships were defined as in Perrett *et al.* (2002). A long-term relationship was defined as, 'Examples of this type of relationship would include someone you may want to move in with, someone you may consider leaving a current partner to be with, and someone you may, at some point, wish to marry (or enter into a relationship on similar grounds as marriage).' A short-term relationship was defined as, 'This implies that the relationship may not last a long time. Examples of this type of relationship would include a single date accepted on the spur of the moment, an affair within a long-term relationship, and the possibility of a one-night stand.'

(d) *Statistical analyses*
For each context, the number of times participants chose their own transformed image as the more trustworthy or attractive of a pair out of a possible eight choices (self-score) was compared with the average number of times that the other participants in that testing unit chose the same image (control score). The distribution of these scores deviated from normality, so Wilcoxon signed-ranks tests were used to compare self-scores with control scores for each participant's image. One-tailed p-values are reported because self-resemblance was predicted to increase trustworthiness and decrease attractiveness, particularly in the context of a short-term relationship.

Preference scores, calculated for each context by subtracting control scores from self-scores, were normally distributed (Kolmogorov–Smirnov tests; all $Z < 1.2$, $p > 0.14$), so a factorial repeated measures ANOVA was used to examine the within-subject effect of context (trustworthiness, long-term attractiveness and short-term attractiveness), and the between-subjects effect of participant sex. Because self-resemblance was predicted to increase trustworthiness more than attractiveness and decrease attractiveness for short-term more than long-term relationships, one-tailed p-values are reported.

2. RESULTS
Compared with controls, participants judged their own transformed image as more trustworthy ($Z_{143} = 2.42$, $p = 0.008$), equally attractive for a long-term relationship ($Z_{143} = 0.05$, $p = 0.481$) and less attractive for a short-term relationship ($Z_{143} = -2.04$, $p = 0.021$).

Preferences for self-resemblance were context-dependent ($F_{2,284} = 6.94$, $p = 0.001$; figure 2). Sex of participant had neither a main effect ($F = 1.55$, $p = 0.215$) nor an interaction with context ($F = 0.11$, $p = 0.897$). As predicted, attributions of trustworthiness increased more than attractiveness for long-term ($t_{143} = 2.10$, $p = 0.019$) or short-term relationships ($t_{143} = 3.49$, $p < 0.001$) and
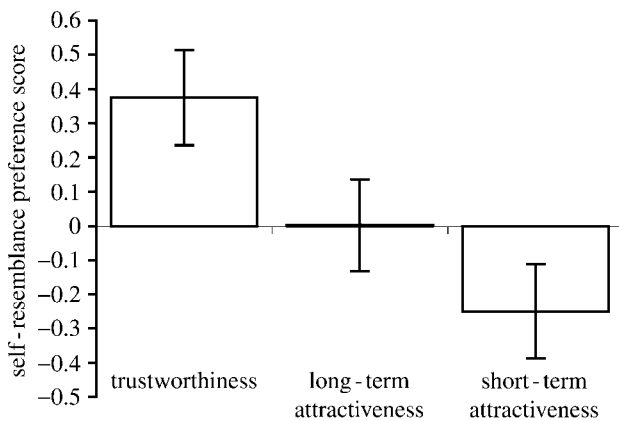
Figure 2. The average preference for self-resemblance in response to the trustworthiness, long-term and short-term relationship questions for 66 men and 78 women.

preferences for self-resemblance were lower in the context of short-term than long-term relationships ($t_{143} = 1.69$, $p = 0.047$).

3. DISCUSSION

Preferences for self-resembling faces are sensitive to context in ways that were predicted from considerations of inclusive fitness theory (Hamilton 1964) and the costs of inbreeding (May 1979; Bittles & Neel 1994; Bittles 2001). In the present study, facial resemblance, a putative cue of relatedness, increased judgments of trustworthiness but had no effect on attractiveness in the context of a long-term relationship and decreased attractiveness in the context of a short-term relationship. Perceptions of trustworthiness were increased significantly more than perceptions of attractiveness for long-term or short-term relationships. Attractiveness of self-resembling faces was decreased more in the context of short-term than long-term relationships.

The results of this study conflict with those reporting facial resemblance between romantic partners (Griffths & Kunz 1973; Zajonc et al. 1987; Hinsz 1989). Possibly these differences reflect a discord between preferences, which are unconstrained, and behaviour, which is inevitably a compromise between desire and the availability of potential mates who reciprocate that desire. Additionally, these studies rely on third-party observers to match couples and do not attempt a more objective assessment of facial similarity. It may be that observers are matching couples on compatible, rather than similar, attributes, or are matching on similarities that are not indicative of kinship. However, evidence of parental imprinting in both preference and partner choice (Perrett et al. 2002; Little et al. 2003; Bereczkei et al. 2002, 2004) suggests that at least some aspects of similarity to self or family are attractive. Perhaps more interesting is the question of whether short-term partners resemble self or family less than long-term partners do. The results of the current study predict that this would be so.

The context-dependent effects observed in the current study would not be expected if 'mere exposure' to one's own face solely accounts for behaviour and attributions toward similar faces. Instead, these results provide evidence that similar faces are not *generally* preferred because they look familiar, but are evaluated differently in contexts where the historically adaptive response to kin would have been different. This strengthens the argument that humans use facial resemblance as a cue of kinship to which they respond in a specialized, potentially adaptive manner.

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