

**Preference for faces resembling opposite-sex parents is moderated by emotional closeness in childhood**

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## **Abstract**

Several studies have found that individuals select partners who resemble their parents. The evidence for this effect seems stronger in relation to opposite-sex than same-sex parents, although the ultimate-level biological explanations put forward to explain these preferences do not seem to require that they need to be built on the appearance of the opposite-sex parent, rather than any other immediate family member. We set out to revisit this question, while assessing face preferences rather than partner choice. Face preferences might uncover more subtle effects than partner choice, as they can elucidate preferences in an unconstrained environment. We presented participants with faces manipulated to resemble their mother, father or self, but did not find that they selected these faces as more suitable for relationships than control faces. However, consistent with previous work, participants who reported less childhood rejection by their opposite-sex parent selected faces that resembled that parent significantly more frequently than control faces. Taken together with previous work, opposite-sex parental faces seem more important than same-sex parental faces in shaping partner preferences, and childhood relationships seem to modify potential attraction to parent-resembling faces. Despite some inconsistent findings, this effect has been detected across the different methodologies used to assess preferences.

Keywords: Sexual imprinting; mate choice; optimal outbreeding; attachment.

## Introduction

People select partners who resemble their parents, and in particular their opposite-sex parent. Independent judges perceive similarity between the face of a woman's husband and her father (Berezkei, Gyuris, Koves, & Bernath, 2002; Berezkei, Gyuris & Weisfeld, 2004; see also Fraley & Marks, 2010; but see Marcinkowska & Rantala, 2012; Nojo, Ihara, Furusawa, & Ishida, 2011; Nojo, Tamura, & Ihara, 2012), and between the face of a man's wife and his mother (Berezkei et al., 2002; Marcinkowska & Rantala, 2012; but see Nojo et al., 2011, 2012). People with older parents have stronger preferences for faces that look older (Heffernan & Fraley, 2013; Perrett et al., 2002; Wilson & Barrett, 1987; Zei, Astolfi, & Jayakaret, 1981). The hair and eye colour, and ethnicity, of an individual's parents tend to be similar to that of their partner (Jedlicka, 1980, 1984; Little, Penton-Voak, Burt, & Perrett, 2003; Wilson & Barrett 1987; Saxton, 2016). Preferences for parent-similar features extend beyond faces, to body hair (Rantala, Pölkki, & Rantala, 2010) and to height (Seki, Ihara, & Aoki, 2012). These preferences appear to be acquired based on people's interactions with their parents; people who report better relationships with their parents tend to have stronger preferences for faces that resemble those parents (Wiszevska, Pawlowski, & Boothroyd, 2007; see also Kocsor, Gyuris, & Berezkei, 2013; Saxton, 2016; Vukovic et al., 2015; Watkins et al., 2011), and these preferences are also reflected in their actual mate choice (Berezkei et al., 2002, 2004; but see Marcinkowska & Rantala, 2012; Nojo et al., 2012). This suggests an imprinting-like mechanism that influences mate-choice preferences in adulthood, and that consists of a predisposition to learn certain physical and behavioral cues of the individuals that one is exposed to during childhood and adolescence.

Despite the above findings, there remain two ambiguities in particular. First, the published research often examines the similarity between a participant's parents and the chosen partner (e.g. husband or girlfriend). However, the chosen partner represents the expression of preferences in a constrained environment; it includes influences from external factors such as the parents whom the partner might resemble, and it is biased towards relationships that enjoy at least a degree of long-term success instead of focussing on initial choice.

Investigating people's preferences in an unconstrained environment might give further insight into the parent-similar phenomenon, and might elucidate some of the more subtle effects. The second ambiguity surrounds the roles of the same-sex and opposite-sex parent in contributing to partner preferences. Although people tend to choose partners whose facial coloration and ethnicity is similar in particular to that of their opposite-sex parent,

some research studies have also found some evidence for similarity between an individual's partner and same-sex parent (Jedlicka, 1980, 1984; Little et al., 2003; Saxton, 2016, Wilson & Barrett, 1987). Indeed, many of the ultimate-level biological explanations that have been put forward to explain parent-similar preferences should apply equally to the same-sex as the opposite-sex parent, or even to the self. If preferences for familial faces function to maintain co-adapted gene complexes (Read & Harvey, 1988; see Šterbová & Valentová, 2012) by promoting optimal outbreeding (Bateson 1978, 1980, 1982; Helgason, Palsson, Guthbjartsson, Kristjansson, & Stefanssonet, 2008; Rantala & Marcinkowska, 2011), enhance one's own genetic representation in future generations (Thiessen, 1999), or support the selection of someone who resembles a successful reproducer (Todd & Miller, 1993), then all could arise from preferences for faces that resemble either parent, and all but the last could arise through preferences for faces that resemble the self.

Accordingly, first, the current study set out to test whether people prefer faces that presented undetected resemblances to their parents or themselves, in a forced-choice test using computer-generated images. Second, it set out to disentangle the effects of the same-sex and opposite-sex parent. In both instances, it also took into account the quality of people's relationship with their parents during childhood.

## **2. Methods**

### *2.1 Participants*

Digital photos were gathered from 96 target participants (54 women and 42 men, aged 17–37, all of White ethnicity) and their parents. About one third of the target participants were photographed under standard conditions by the authors. The rest of the target participants, and all of the parents, photographed themselves at home. They received a detailed set of instructions, and if the images were not of satisfactory quality, they were asked to take new ones. The participants and their parents provided written informed consent to use their facial photographs in the research. Participants under the age of 18 were photographed at their homes in the presence of their parents who gave verbal informed consent to allow their offspring to participate. The procedure corresponds to the rules of the local Ethical Committee.

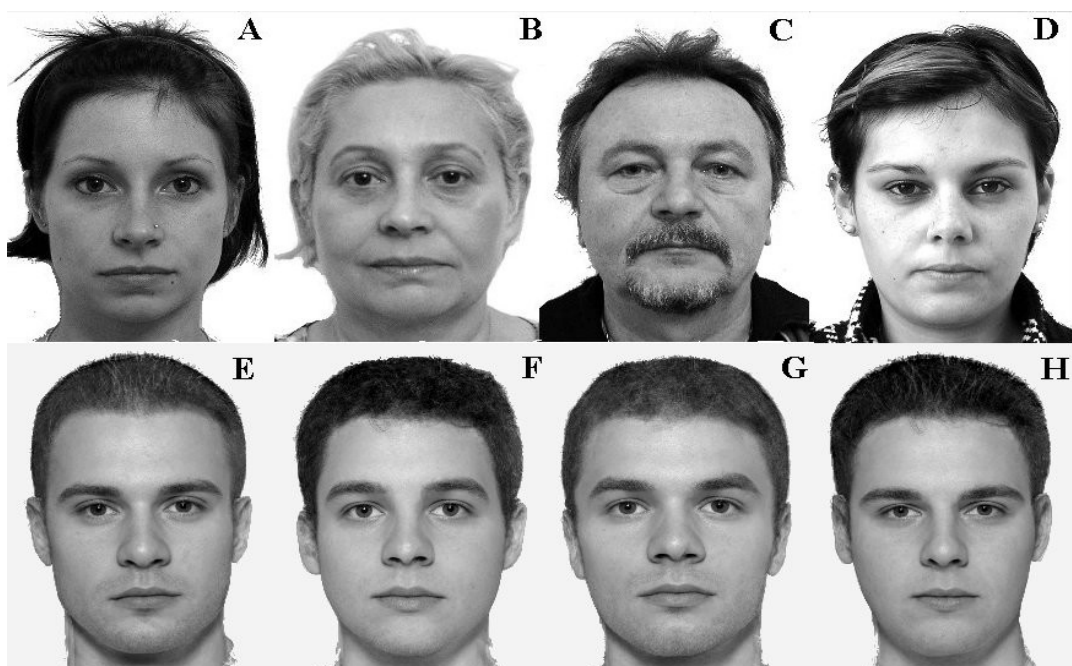
## 2.2 Stimuli

The computer software *Psychomorph* (Tiddeman, Burt, & Perrett, 2001; Tiddeman, Stirrat, & Perrett, 2005) was used to construct four male and four female composite faces, each made up of 8 participants (aged 18–26, which is similar to the age range of the target participants) who provided their informed consent.

Opposite-sex averages were transformed 50% in shape in order to resemble either the target participants, their parents, or an unknown individual. To prepare self-resembling faces, 50% of the shape differences between the individual and the same-sex average face (reference endpoint) was applied to the opposite-sex face (base image). To avoid perceived “aging” of the base images during transformation to parental faces, we used middle-aged composite images as reference endpoints (see DeBruine, Jones, Little, & Perrett, 2008 for overview of the method). For each target participant, a random control individual was chosen from the image pool, and used to create all of the control faces presented to that target individual..

**Figure 1.** Individual faces and male transforms.

This figure shows individual photographs and examples of transforms that were presented to female subjects in the experiment. **A:** A female subject; **B:** the female subject's mother; **C:** the female subject's father; **D:** an unknown face (control); **E-H:** the female subject's face transformed into four composites. The individuals in these photographs have provided written informed consent to the publication of their photograph.



### *2.3 Procedure*

The resultant images were presented with DMDX presentation software (University of Arizona) in a randomised forced-choice face preference test where all six pairings possible between mother-similar, father-similar, self-similar and similar to the control were presented four times (once for each of the four composites), thus totalling 24 pairs of faces. The focal pairs were the familial faces paired with a control, and the parent/parent pairs. The other pairs were presented in order to keep the frequency of all appearing pictures at the same rate and thereby avoid unequal adaptation effects. The use of four different composites served to enhance diversity of the stimuli and multiply the number of trials while maintaining the participants' attention throughout the experiment. Target participants were instructed to select which of the two faces in the pair they would prefer as a potential partner. Participants only rated opposite-sex faces. After the rating they were debriefed: none of them reported that they were aware of how the images were manipulated or that they recognised themselves or their parents in the presented images. Finally, the target participants were asked to complete the short form of the EMBU retrospective perceived parental bonding questionnaire (Arrindell et al., 1999), which provides scores on three subscales (emotional warmth, rejection and overprotection) in respect of each parent, and has been used in previous studies of the link between parental-similar face preference and childhood parental relationships (e.g., Berezkei et al., 2002; 2004; Nojo et al., 2012). Preference scores for self, father or mother-resembling faces were calculated by counting the number of times the participants chose a particular face-transform over the control transform. As four different transforms, made by using different composites, were created for each individual face, the scores ranged from 0 to 4.

## **3. Results**

### *3.1 Preferences for self- and family-resemblance*

Only responses to those face pairs were analysed which were in relation with the hypotheses being tested (i.e., parent- and self-resembling faces vs. controls, and the parent/parent pairs). The other pairs, introduced for methodological reasons (see Section 2.3), were omitted from the analysis. There was no evidence that individuals selected the self-resembling or parent-resembling faces as more attractive than the alternatives at rates greater than chance in the forced-choice face preference test (Table 1; chance rates would be a choice of

two faces out of the four). Independent-samples t-tests showed that there were no differences in the choices of male and female target participants.

**Table 1.** Statistical data of the one-sample t-test showing the selection of self-or family-resembling faces against the alternatives, and the results of the independent-samples t-test testing sex differences in the choices.

Contrast	Mean selection rate of 4 (2 = chance)	n <sup>a</sup> (males)	One-sample t-		Independent	
			test		samples t-test	
			t	p	t	p
Same-sex parent over control	1.83	93 (39)	-1.08	.285	-1.144	.255
Opposite-sex parent over control	2.09	87 (38)	.60	.547	-1.301	.197
Same-sex over opposite-sex parent	2.20	84 (35)	1.38	.171	.178	.860
Self over control	2.16	96 (42)	1.42	.159	-1.368	.176

<sup>a</sup> N-values differ because some of the participants had only one parent from which they could provide photographs.

Note: none of the t values are significant.

### 3.2 Effect of attachment on face preferences

To test the impact of perceived parental bonding in childhood on face preferences, we used hierarchical multiple linear regressions, where the outcome variables were the frequency of choices for one type of face over another, and the predictor variables were the scores of the six EMBU sub-scales (Table 2). In the regression where we compared preferences for the faces that resembled the same-sex parent against those that resembled the opposite-sex parent, the predictor variables were the differences between the scores given to the same-sex parent and the scores given to the opposite-sex parent.

In each of the regressions, Model 1 assessed the effect of participant sex on choice, whereas Model 2 captured the contribution of the relevant EMBU-sub-scales. We used the enter method to put participant sex into Model 1, while we used the stepwise method to put the six parental bonding subscales into Model 2. None of the models testing preferences for parent-resembling faces showed an effect of participant sex. Parental bonding was

significant in relation only to preferences for faces resembling the opposite-sex parent: participants who scored lower on the rejection subscale of the EMBU (i.e., less experience of rejection from the opposite-sex parent) were more likely to state that the face that resembled their opposite-sex parent would be a better partner than the alternative. The other subscales were excluded from the model by the algorithm as they did not influence the outcome variable significantly.

In the case of self-resembling faces, we put all EMBU-subcales into Model 2 to see how perceived parental bonding could influence the preference for self-resembling faces. However, only Model 1 was significant, and the EMBU-scores were excluded, suggesting that men are more likely to chose faces similar to themselves, with no significant influence of parental bonding on that choice. Despite this, men did not select self-resembling faces at rates greater than chance (one-sample t-test:  $t = 1.711$ ;  $df = 41$ ;  $p = .095$ ).

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**Table 2.** Results of the hierarchical multiple linear regressions testing the relationship between the EMBU-subscales and preferences for familial faces. Standardised preference scores refer to the control measures.

Contrast	Models	Predictors	Preference scores <sup>a</sup>			Standardised preference scores <sup>a</sup>		
			$\Delta R^2$	$\beta$	p	$\Delta R^2$	$\beta$	p
<b>Same-sex parent over control</b>	Model 1	Sex						
		(female=0, male=1)	.016	.125	.260			
<b>Opposite-sex parent over control</b>	Model 1	Sex	.028	.168	.142	.007	-.086	.536
	Model 2 <sup>b</sup>	Sex		.156	.151		-.137	.301
		Rejection	<b>.102*</b>	<b>-.320*</b>	<b>.004*</b>	<b>.133*</b>	<b>-.368*</b>	<b>.007*</b>
<b>Same-sex over opposite-sex parent<sup>c</sup></b>	Model 1	Sex	.003	-.058	.619			
<b>Self over control</b>	Model 1	Sex	<b>.055*</b>	<b>.234*</b>	<b>.031*</b>			

Notes:

\*Values are significant on a  $p < .05$  level.

<sup>a</sup>The sample sizes of the regressions with unstandardised and standardised are different (see 3.3).

<sup>b</sup>Model 2 was calculated where the stepwise regression indicated that apart from participant sex at least one other predictor contributed to the model significantly.

<sup>c</sup>The EMBU-subcales refer here to the difference between the scores for the same and opposite-sex parents.

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### 3.3 Control measures

To make sure that the significant results were not false positives, and to rule out the possibility that the preference scores could be biased if the parental images differed systematically in attractiveness from the control images, ten independent judges (age  $M = 25.1$ ,  $SD = 5.92$ , five females) were asked to rate the same face pairs as the target participants. The average number of times that the judges chose the parent-resembling faces as

more attractive than the controls was subtracted from the parent-preference scores of the target participants, giving rise to standardised preference scores that controlled for parental attractiveness. Due to technical problems during the testing, standardised scores could be calculated for only 68 of the 96 participants. When the standardised preference scores were used, the full model and rejection as a predictor remained significant and qualitatively identical to the former analysis (Table 2), supporting the role of childhood rejection by the opposite-sex parent in shaping face preferences.

#### **4. Discussion**

We set out to investigate participants' judgements of faces that had been manipulated to show consciously undetected resemblance to themselves, their mother, and their father. We also investigated whether participants' judgements might differ depending on their reports of their emotional closeness to their parents as they were growing up. Our analysis demonstrated preferences for faces that resembled the opposite-sex parent's face. However, this preference was observable only in light of the perceived parental bonding of the participants. Participants with lower scores on the rejection subscale of the EMBU questionnaire in relation to their opposite-sex parent's face were more likely to choose faces resembling that parent. None of the other subscales had any effect on this choice. The analysis of the standardised scores confirmed our findings, which suggests that it is unlikely that the participants' choice was due to random differences between the attractiveness of both faces within the pairs.

We found no evidence for preferences for faces that resembled the same-sex parent. Participants did not select faces that resembled their same-sex parent at rates that exceeded chance, and we found no evidence that their preferences were affected by their report of their childhood relationship with their parent. In line with previous research, the evidence generally seems to indicate that opposite-sex parental faces are more important than same-sex parental faces in shaping adulthood face preferences. Further research might focus on investigating the reasons for this: for example, at the proximate level, this difference might be a consequence of perception (for instance, the difficulty in detecting similarities between faces of differing sex), while at the ultimate level, there might be some differential effect on reproductive outcome.

Studies vary somewhat in whether they report that people find self-resembling faces attractive: some have found that manipulating self-resemblance has a neutral or non-significant positive effect on attractiveness ratings

(Marcinkowska, Moore, & Rantala, 2013; Penton-Voak, Perrett, & Peirce 1999), and is aversive in a short-term relationship context (DeBruine, 2005) or at the high-fertility phase of the menstrual cycle (DeBruine, Jones, & Perrett, 2005), while other work has found a positive effect of self-resemblance on perceptions of attractiveness (Kocsor et al., 2011; Laeng, Vermeer, & Sulutvedt, 2013; Saxton et al., 2009; Sulutvedt & Laeng, 2014). We did not find here that self-resemblance enhanced the appeal of faces in a relationship context, and in addition were not able to replicate findings that participants' preferences for self-resembling faces were predicted by their reported childhood relationship with their father (Watkins et al., 2011). Although men selected self-resembling faces at rates significantly exceeding women, neither men nor women selected self-resembling faces at rates greater than chance. These were null results, and so we did not obtain standardised scores to attempt to verify them.

The studies described in Nojo et al. (2011) and Sulutvedt and Laeng (2014) used similar image manipulation techniques as our study. Like us, they did not find a direct connection between parental resemblance and perceived attractiveness, but nor did they assess childhood relationship as a potential mediating factor, which may be crucial in acquiring preferences for parental facial characteristics (see Bereczkei et al., 2002, 2004; Kocsor et al., 2013; Vukovic, Boothroyd, Meins, & Burt, 2015; Saxton, 2016). Face preferences might also differ from partner choice: it might be that parental resemblance is not highly instrumental in initial attraction, but contributes to the longevity of a relationship, for instance. Similarly, the expected duration of the relationship could also be influential. The studies published to date on preferences for parent-resembling faces that used image manipulation techniques, including the current one, are limited in the sense that they did not ask participants explicitly to distinguish between short-term and long-term relationships. In future research that aims at disentangling the factors behind mate choice decisions related to the facial appearance of parents or other close relatives, this needs to be addressed. Overall, these results are broadly consistent with an emerging picture of the effects of parental resemblance on preferences (e.g. Bereczkei et al., 2002, 2004) that might be stronger in relation to the opposite-sex than the same-sex parent, and perhaps only evident when childhood relationships are taken into account.

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