



Original Article

Concurrent parent–child relationship quality is associated with an imprinting-like effect in children's facial preferences



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ABSTRACT

Humans have been shown to display phenomena resembling sexual imprinting, whereby adults are attracted to features in potential mates which resemble their opposite sex parent. In humans this may be particularly so when the parent–child relationship is positive, but there are currently limited data elucidating the causes of these patterns. Here we investigate whether such preferences can be documented in children on the cusp of puberty, for whom prospective data exist on parent–child relationships. Sixty 9-year-olds and their parents were recruited from a British longitudinal sample who have been studied since infancy. Parents were photographed, and children were then presented with stimuli in which a computer generated face was manipulated to appear more or less like the parent. Children also reported on their current relationship with each parent. Although attachment at 15 months did not predict imprinting at 9 years of age, children reporting a more accepting current relationship with their parents preferred parental features significantly more than those who reported a more rejecting relationship with their parents. These data support the suggestion that imprinting-like phenomena in humans may arise through associative learning.

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1. Introduction

Sexual imprinting, the phenomenon whereby individuals' mate choice is influenced at an early stage by the features of their parents (or foster parents), has been well documented in non-human species (for a review see Rantala & Marcinkowska, 2011). In certain mate-choice relevant contexts, there is also evidence that human adults prefer individuals with features that resemble their parents. For example, Little, Penton-Voak, Burt, and Perrett (2003) found that participants reported their romantic partners possessed similar hair and eye colors to those of their opposite-sex parents. Similarly, Jedlicka (1980) found that men were likely to marry women of the same ethnic origins as their mothers, whereas women tended to marry men of the same ethnic origins as their fathers. More recently, Rantala, Pölkki, and Rantala (2010) found that the reported hairiness of women's fathers was correlated with women's reports of the hairiness of their romantic partners, as well as their preferences for the presence or absence of body hair in images of male torsos. Parental age relative to oneself (Perrett et al., 2002) as well as parental personality characteristics (Gyuris, Jarai, & Bereczkei, 2010) have also been shown to be associated with adults' preferences for similar characteristics in potential and actual partners, respectively. Collectively, these studies present evidence for an association between

parental traits and both actual and potential romantic partner characteristics.

The mechanism via which such preferences arise is unclear. Some authors have suggested that during the course of development to sexual maturity, individuals learn about parental characteristics, and these experiences with parents shape mate-choice relevant decisions later in life (Bereczkei, Gyuris, & Weisfeld, 2004; Little et al., 2003; also see Mateo & Johnston, 2003). Alternatively, preferences for parental features in opposite-sex partners could come about as a result of the heritability of such preferences or via a mechanism that allows individuals to recognize others that resemble self or kin (see Mateo & Johnston, 2003; Rantala & Marcinkowska, 2011). To exclude issues of heritability, Bereczkei et al. (2004) recruited a sample of adopted female participants and found that women's fathers resembled their husbands, with retrospectively reported closeness of relationship to father moderating this effect. The importance of family relationships (at least as retrospectively reported by participants) has also been seen in other studies. Bereczkei, Gyuris, Kovcs, and Bernath (2002) found a similar effect between genetically related mothers and sons (although Marcinkowska & Rantala, 2012, failed to replicate), while Wiszewska, Pawlowski, and Boothroyd (2007) reported that the facial proportions of women's fathers correlated positively with the proportions of male faces they found attractive, but only if daughters reported a positive relationship with their father in childhood. Similarly, Watkins et al. (2011) found that women who reported being emotionally close to their fathers had stronger preferences for opposite-sex faces resembling themselves. Since it is unlikely that self or kin phenotypes are preferentially learned from opposite-sex parents, the opposite-sex specificity shown in these

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studies (Watkins et al., 2011; Wiszewska et al., 2007) is evidence against the argument that preferences for parental features arise simply via a self- or kin-recognition mechanism.

The question thus arises: why would reported parental relationship quality moderate individuals' tendency to be attracted to people who resemble their parents? There are a number of possible answers to this question. First, parent–child relationship quality may index the amount of exposure to the parent. Because simple visual exposure to faces has been found experimentally to influence face preferences in both adults (Rhodes, Jeffery, Watson, Clifford, & Nakayama, 2003; Webster & MacLeod, 2011) and children (Anzures, Mondloch, & Lackner, 2009), it could be that parents with better relationships with their children spend more time with those children, resulting in a more parent-biased facial prototype in the child and thus a tendency to prefer parental features in potential partners. Second, simple associative learning may account for a greater preference for parental features in individuals who reported close parental relationships. Children with better relationships may have exposure to the parent's face that is accompanied by more positively valenced experiences that then lead to preferences for parental facial features. Preferences for arbitrary facial features can be induced experimentally by pairing certain features with pleasant or aversive auditory stimuli (Jones, DeBruine, Little, & Feinberg, 2007), but it is not known whether this learning holds for real life emotional experiences and naturalistic exposure to faces.

These explanations both assume that individuals' early experiences with parents play a role in the ontogeny of preferences for parent-like facial characteristics, but previous research has not assessed early relationships directly, relying only on adults' retrospective report. In particular, no study has yet investigated the relation between the quality of parental relationships and preferences for parent-like characteristics both concurrently and prospectively in childhood. Addressing these issues was the aim of the study reported here. Given that many facets of adult facial attraction have been documented in middle to late childhood (Boothroyd, Meins, Vukovic, & Burt, 2014), and that, as discussed above, recent visual experience can affect preferences in children (Cooper, Geldart, Mondloch, & Maurer, 2006; Anzures et al., 2009), it is reasonable to suppose that the preference for parent-like features which underlies sexual imprinting in adults may also emerge around this time.

The present study explored how the quality of children's attachment relationships in infancy predicted their preferences for parental facial characteristics at age 9. Children's attachment security was assessed at age 15 months using the strange situation procedure (Ainsworth, Blehar, Waters, & Wall, 1978; Main & Solomon, 1986, 1990) which places infants into one of four categories on the basis of their response to brief separation from the caregiver and subsequent reunion: secure, insecure-avoidant, insecure-resistant, insecure-disorganized. Attachment security in infancy is known to predict a number of factors that are likely to be relevant to understanding individual differences in preferences for parent-like faces. For example, insecure-avoidant attachment in infancy is associated with children turning more to social partners other than the mother for interaction or information. Meins et al. (2011) reported that, compared with their peers in the other attachment categories, avoidant infants were more likely to initiate social interaction with an experimenter. Insecure-avoidant attachment was also associated with a tendency not to initiate joint attention with the mother.

Similarly, attachment in infancy has been found to predict children's engagement with social partners other than the mother in the preschool years. Sroufe, Fox, and Pancake's (1983) findings showed that children classified as insecure-avoidant in infancy were more likely than their secure and insecure-resistant counterparts to seek help from their teachers when they began school. Corriveau et al. (2009) reported that insecure-avoidant attachment in infancy was associated with a tendency at ages 4 and 5 not to trust information provided by the mother, with avoidant-group children preferring to rely on an experimenter's or their own judgements. Taken together, these studies suggest that early

insecure attachment, and avoidant attachment in particular, may be associated with lower levels of preference for parent-like facial characteristics. Given that attachment may be an important evolved process with established long term correlates in terms of sexual strategies (for discussion see e.g. Del Giudice, 2009), identifying attachment-related differences in facial preferences could shed further light on the reasons for the observed effects of early attachment.

A final alternative, consistent with an associative learning account, is that the quality of the current parent–child relationship (i.e., the most recent 'conditioning experiences') may be more critical than distal relationship quality in predicting preferences for parent-like facial characteristics. Moreover, several studies suggest that attachment security is not stable from infancy to childhood or late adolescence (Bar-Haim, Sutton, Fox, & Marvin, 2000; NICHD, 2001; Trapolini, Ungerer, & McMahon, 2007; Pinguart, Feußner, & Ahnert, 2013; Booth-LaForce & Roisman, 2014), highlighting the need to consider the quality of both early and concurrent parent–child relationships. Consequently, the study reported here included an assessment of current relationship quality.

In summary, the present study explored relations between children's preferences for parent-like facial features at age 9 and (a) attachment security in infancy, (b) the quality of the current parent–child relationship, and (c) amount of exposure to parents, to explore the comparative contributions of early and concurrent parent–child relationships to children's facial preferences.

2. Method

2.1. Participants

Participants were 62 families (62 mothers, 45 fathers, 62 children of whom 29 were girls) who had been participating in a longitudinal study since the first year of life. Infant attachment data were collected at age 15 months ($M = 15.5$, $SD = 0.60$, range 13.7–17.3). Facial preferences and parental relationship quality data were collected at a follow-up when children were age 9. Although both parents were invited to participate, 16 fathers were not able to schedule a convenient testing session, and one father was no longer in contact with the child. One of the fathers included in the study was not the child's biological father, but all the other parents were biologically related to the child. Of the participating mother–father pairs, one pair was separated, and the rest were still living together. Parents gave informed consent at both testing phases, and children themselves gave verbal assent to participate at age 9.

2.2. Materials and methods

Testing sessions at phase 1 (15 months) and phase 2 (9 years) were conducted in the university's developmental laboratories. The attachment assessment at phase 1 was conducted at the end of a one-hour session. At phase 2, parents were photographed, after which the parents and the child completed their questionnaires in separate interconnecting rooms. After a short break, the child completed the face preference test. Each child received £5 and a sticker at the end of the session.

2.2.1. Attachment security

Infant–Mother attachment security was assessed using the strange situation procedure (Ainsworth et al., 1978; Main & Solomon, 1986, 1990). All of the strange situations were classified by a trained and reliable researcher who was blind to all other measures. A second blind, reliable researcher coded a randomly selected 25% of strange situations. Inter-rater reliability using the four-way classification system was $\kappa = 0.82$. Attachment data were available for 60 children (two strange situations were terminated due to extreme infant distress), and the distribution across the categories was as follows: 41 secure, 13 insecure-avoidant, and 6 insecure-resistant.

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