Putting beauty back in the eye of the beholder

ANTHONY LITTLE *and* **DAVID PERRETT** *(winner of the 2000 Presidents' Award for Distinguished Contributions to Psychological Knowledge) discuss evolution and individual differences in face preference.*

OUR magazines and television screens are filled with images of 'attractive' people, and it is obvious that both women and men are highly concerned with good looks in a partner. But exactly what is it that makes a face beautiful? What makes people seek out and desire to mate with the owners of beautiful faces?

It is difficult to verbalise what differentiates average from good-looking individuals, and in modern times there is a pervasive view that attractiveness simply cannot be defined. Common phrases such as 'beauty is in the eye of the beholder' and 'beauty is only skin deep' are testaments to our belief that attractiveness is ephemeral. For example, the philosopher David Hume is often quoted for making the argument that beauty 'is no quality in things themselves: it exists merely in the mind which contemplates them; and each mind contemplates a different beauty' (Hume, 1757, p.208–209).

But something in this politically correct view of beauty just does not ring true. Admittedly the latest big movie star is not everyone's favourite pin-up; but it is undeniable that on average Hollywood stars are generally more attractive than the people we meet in the street. You may disagree over your best friend's choice of partner but there are countless individuals that you and your friend could agree were more or less attractive than the particular partner.

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This problem with considering beauty as only in the eye of the beholder is nicely illustrated in Figure 1. Here, the two faces are both symmetric and have perfectly smooth skin, yet the composite on the right made from the faces of 50 models is systematically different from the composite student face in both shape and coloration. Most people will agree it is more attractive. Some people are beautiful and some people are not, and most people agree on who is and who is not beautiful.

Agreement between individuals is in fact one of the best-documented and most robust findings in facial attractiveness research since the 1970s. Across many studies it has been found that there is a high degree of agreement from individuals within a particular culture, and high agreement between individuals from different cultures (see Langlois *et al.*, 2000, for a meta-analytic review). If different people can agree on which faces are attractive and which faces are not attractive when judging faces of varying ethnic background, then this suggests that people everywhere are all using the same, or at least similar, criteria in their judgements.

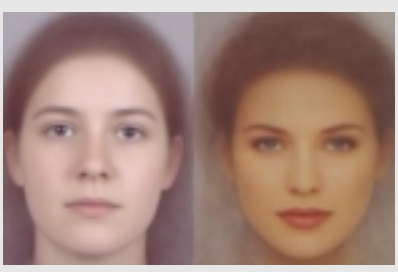
Evolution and attractiveness

Physical appearance is important to humans and there appear to be certain features that are found attractive across individuals and cultures. The same holds true across the animal kingdom: most non-human species rely on external factors, such as the sizes, shape and colour of adornments (e.g. feathers, fur, and fins) to attract mates. Research on animals has focused on individual traits that are attractive across individuals (and even species) such as symmetry (e.g. Møller & Thornhill, 1998).

Such experiments are driven by evolutionary theory, which posits that the attractiveness of individuals is directly linked to their value as mates. High-value mates are those who can best enhance the reproductive success of the individual who chooses them. Individuals who were attentive to cues to high mate-value, and based mate-choice decisions on these cues, left behind more offspring (and so more genes for attending to attractive cues) than those who failed to attend to these cues. Such evolutionary reasoning can also be applied to humans. In essence, the evolutionary view suggests that when making attractiveness decisions we are all, albeit unconsciously, asking the question 'What can the owners of beautiful faces do for us in order that our genes survive to subsequent generations?'

In many studies this evolutionary view of attractiveness has been powerful in predicting the specific characteristics of attractive faces (see Thornhill & Gangestad, 1999, for a review). A central tenet of the evolutionary view is that individuals should agree on the characteristics that make up attractiveness (e.g. Langlois *et al.*, 2000). For example, males who preferred women past reproductive age would not have left their genes in the next generation and so we

FIGURE 1



might expect a universal preference for youth in males.

Proposed universal preferences are consistent with the cross-cultural agreement on attractiveness. For example, youth, which is associated with fertility and the potential for offspring production in women, has been found to be attractive in faces across individuals and cultures (Buss, 1989). We will now look in more detail at another example of a universal characteristic of beauty and its proposed evolutionary root.

Facial symmetry

Research on symmetry has been conducted on many animal species and provides a good example of a characteristic of human faces that is proposed to be attractive across observers. Symmetry refers to the extent that the left half of an organism is the same as the right. It is a significant characteristic, as it can be seen as a measure of the ability of an organism to cope with environmental stress (e.g. food scarcity): the optimal developmental outcome for most characteristics is symmetry. Only high-quality individuals can maintain symmetric development under environmental and genetic stress; therefore symmetry can serve as an indicator of the quality of an individual as well as the quality of their genes (see Møller & Thornhill, 1998). For example, individuals with genes coding for strong immune function will be more resistant to infection, allowing their bodies to grow more symmetrically than individuals with lower immune capacity, who will be 'stressed' more by exposure to the same infection.

When manipulating symmetry with computer graphics, symmetric faces are found to be preferred over less symmetric faces (e.g. the symmetric faces on the bottom row of Figure 2) (Perrett *et al.*, 1999; Rhodes *et al.*, 1998). Measuring symmetry in real faces reveals a positive correlation with rated attractiveness (e.g. Grammer & Thornhill, 1994; Mealy *et al.*, 1999; Penton-Voak *et al.*, 2001).

Individual differences

Having argued for the *universality* of attractive traits, we now examine some factors that may lead to *individual differences* in the perception of facial attractiveness and speculate on how such differences may arise from learning and differences in life history. Across the animal kingdom not all members of a given species engage in the same mating behaviour. Indeed, within a species there may be a range of mating strategies that can be employed based on both environmental cues and individual physical attributes. In humans, whilst individuals may share certain basic criteria for finding faces attractive, many factors may influence the specific types of face they find attractive.

FIGURE 2

Look-alikes

It is a widespread belief that partners look alike (e.g. the 1930 portrait by Grant Wood called *American Gothic*, below). Positive assortative mating occurs when individuals form pairs in which the individuals involved are more similar to each other than would be expected by chance (Burley, 1983). In humans, mating with similar individuals to oneself may have genetic benefits. For example, Thiessen and Gregg (1980) have proposed that mating with similar-looking individuals increases the chances that those individuals have genes in common with you, and that mating with such individuals can be advantageous to your genes. Of course the advantages of mating with similar individuals has its limits. Mating with your close family members is referred to as inbreeding, which reduces genetic diversity and increases the chances of harmful recessive genes being expressed in offspring. The best strategy might be to avoid mating with close relatives but to mate with someone genetically more similar to you than average. Bateson (1982) called this notion optimal outbreeding and demonstrated its occurrence in Japanese quail. Birds of both sexes were attracted to first cousins over siblings and unrelated individuals.

Early research on assortative mating in

Birds of a feather?

humans focused on correlations in physical characteristics between partners, such as arm length. Reviews show an overall pattern of low positive correlations (0.01 to 0.35) for many physical features (e.g. Spuhler, 1968). Married partners' faces also resemble each other in ways that allow them to be identified as partners, possibly indicating assortative mating for similar face shapes (e.g. Hinsz, 1989).

Partners also appear to assort for many non-physical traits such as religion, educational level and personality (Botwin *et al.*, 1997; Thiessen & Gregg, 1980). Assortative mating may also simply result in more stable partnerships, as it has been shown that couples who are similar on a variety of traits are less likely to break up (Hill *et al*., 1976).

The above studies point to consistent matching for a wide range of characteristics among partners. Given this assortment, it is possible that individuals are attracted to others who resemble them physically. Self-similar attraction could be based on each person noticing his or her own traits. An experiment by Marion Petrie and colleagues has shown in peacocks that individuals appear to recognise kin without ever having seen any other members of their family. They released a mixed group of related and unrelated peacocks and found that brothers raised separately established their display sites very close together (Petrie *et al.*, 1999). It is possible that peacocks recognise kin by examining their own body, and this is a potential mechanism for assortative mating for traits in other animals.

Research thus suggests that awareness of one's own traits may encourage choice of partners similar to oneself. Seeking out a partner who is similar to you, however, is also consistent with attraction to parental traits, as usually children physically resemble their parents. This leads us to consider the influence of parental characteristics on mate preferences in humans.

Attraction to parental traits

In humans there have been few studies on the effects of parental characteristics on the partner choice of offspring – although the idea of attraction to the opposite sex parent's form is a popular notion, mainly due to the speculation of psychoanalytic theorists (e.g. Freud, 1927). In animals the effect of parental traits on later mate choice has received much attention. Imprinting refers to a phenomenon whereby experience at an early age influences later behaviour including mate preferences. Konrad Lorenz (1943) drew attention to this phenomenon having found that ducklings would imprint on and follow his patterned boots. Young animals see parental traits (such as plumage colour) at an early age, and later in life find these traits either unattractive or attractive in mates. Attraction to parental characteristics has been demonstrated in a wide variety of avian (see ten Cate & Vos, 1998) and mammalian species (Kendrick *et al.*, 1998).

Imprinting has also been proposed as playing a role in human mating, but in the opposite direction. Westermarck (1894) argued that children have an innate tendency to develop a sexual aversion to individuals with whom they live closely in infancy and early childhood (usually siblings and parents). Originally proposed as a mechanism for avoiding sibling incest, such negative imprinting would prevent inbreeding in a population. Westermarck's hypothesis has received empirical support from ethnographic studies where male and female non-siblings are raised together in a way similar to real siblings (e.g. Shepher, 1971). Such individuals avoided marriage or sexual relations with those with whom they were raised.

Westermarck's hypothesis concerns learning to avoid characteristics, but there are studies that do indicate attraction to opposite-sex parental characteristics. Two studies have shown a positive correlation between father's age and the daughter's partner's age (Wilson & Barrett, 1987; Zei *et al.*, 1981). The positive relationship between father's and partner's age is consistent with the possibility of imprinting – daughters may imprint on the visual characteristics of their father (such as their age) as children and later find these characteristics preferable in their own partner. Although both studies are suggestive of sexual imprinting in humans, it should be noted that the correlations in both studies are small and account for little of the variance in the data (in the Zei *et al.* study correlations are between 0.05 and 0.08; in Wilson's study the same correlation is 0.11).

A third study provides stronger evidence for imprinting-like effects in humans. In a study of the spouse choices of individuals with parents of mixed ethnicity, Jedlicka (1980) found that spouse ethnicity corresponded to father's ethnicity for 61.4 per cent of brides and 41.4 per cent of grooms. This relationship was reversed for mothers (mother's and spouse's ethnicity corresponded for 38.6 per cent of brides and 58.6 per cent of grooms). These results indicate that offspring were attracted to, or at least chose to marry, individuals who resembled their opposite-sex parent. Social pressures may provide additional constraints on ethnicity of marriage partners. For example, parents may encourage offspring to engage in relationships that reflect their own partner choices.

To summarise, sexual imprinting may play a role in human mate choice – we may learn to avoid close relations, usually parents and siblings, but still show attraction to parental traits. Given the importance of imprinting in other species

and several suggestive studies on humans, it would be interesting to further explore the role of parental influences on attractiveness judgements in humans.

Attractiveness of the beholder

The attractiveness of men and women's bodies will influence the mate they may acquire and so is likely to impact on their mating strategy. Nancy Burley's (1986) work with zebra finches has demonstrated that manipulating the attractiveness of individuals using coloured leg bands changes the mating strategy they employ. The 'attractiveness' of the bands was measured by their impact on the other birds – some bands decreased the sexual attention received from opposite-sex birds, other bands increased it.

Zebra finches mate monogamously (both in the wild and in captivity) with both males and females equally sharing parental duties. But when Burley gave males 'attractive' leg bands they engaged in polygamous mating, whereas those males given green bands (unattractive) continued to attempt to mate monogamously. Females made attractive with coloured leg bands were found to spend less time carrying out parental duties than both those typical of their sex and unattractive females – but they still had higher reproductive success. Mates of attractive females spent more time than those typical of their sex carrying out parental duties. Again, higher attractiveness allowed females to adjust their strategy and induced partners to behave differently.

More recent work has indicated that physical condition may also influence an individual's preferences as well as their perceived attractiveness. For example, the red coloration of male sticklebacks decreases in intensity with parasite load, and female sticklebacks demonstrate a preference for intense male coloration. Females in poor condition, however, show an unexpected preference for less intensely coloured (i.e. poorer condition) males (Bakker *et al.*, 1999).

So increases in attractiveness cause zebra finches to employ different reproductive tactics, and female condition influences preferences in sticklebacks. Given these findings, it seems plausible to postulate that attractive humans may be able to adopt sexual strategies different from those of unattractive individuals. In a recent study we explored how women's self-rated attractiveness influenced male face-preference. Using faces manipulated with computer graphics, we found that

FIGURE 3

there is an increased preference for masculinity and symmetry in male faces for women who regard themselves as attractive (Little *et al.*, 2001). This finding may reflect a condition-dependent mating strategy analogous to behaviour found in other species.

Both masculinity and symmetry have been proposed to signal a high-quality immune system and therefore markers for 'good genes'. Such males may be better for conferring immunity on children but may be less inclined to invest in parental duties (Thornhill & Gangestad, 1999). A preference for feminine asymmetric males could thus be adaptive for unattractive females, if the benefits of increased paternal investment outweigh the loss of heritable genes for immune quality.

It is also possible that women who are of 'high mate value' (or who *believe* they are) may be more likely to attract and retain a high mate value male (i.e. a masculine and symmetric male) than a lower mate value female would. The perceiver's attractiveness, then, is one important between-individual variable in judgements of facial attractiveness. It is also worth noting that it is a variable that can change due to accident, disease, or ageing – such changes may, as in zebra finches, radically alter an individual's sexual strategies and impact on their preferences.

Within-individual changes

Recent research into male facial attractiveness has revealed that female preferences for male faces vary over the menstrual cycle. Despite a preference for feminine faces most of the time, during the follicular phase of the menstrual cycle when conception is most likely, women prefer relatively masculine faces (Penton-Voak *et al.*, 1999; Penton-Voak & Perrett 2000). In Figure 3, a composite of 20 male faces has been 'feminised' (moved towards a typical female shape) on the left, and 'masculinised' (exaggerating typically male shape) on the right. Overall, most young adult women find slightly feminised faces most attractive; but women at peak fertility are relatively more attracted to masculinised faces.

Male facial masculinity is proposed to be linked to good genes because such traits reflect the action of testosterone, which is an immuno-suppressant. Only males with high-quality immune systems can afford the testosterone handicap required to produce more masculine traits; so, as with other species, masculine traits may advertise an individual's immune quality (see Thornhill & Gangestad, 1999). However, masculine partners may not make ideal long-term partners: there is evidence that males with high testosterone are involved in more troubled relationships and pursue more extra-marital affairs (see Mazur & Booth, 1998).

Females may choose a long-term partner on the basis of co-operation and high parental care (indicated by a feminine appearance). By contrast, when a female is choosing a partner for a short-term relationship (by definition one in which the male is not expected to make a commitment) cues to paternal investment are irrelevant, and she should look to maximise good gene benefits indicated by a relatively masculine appearance. Not all women will need or value an investing partner (e.g. in some populations men may not play a large role in child rearing). In these instances an evolved psychology maximising preference for masculinity (as an index of good genes for disease immunity) over femininity (as an index of investment) at peak fertility would be adaptive.

Conclusions

Evolutionary theory has proved to be a powerful theoretical tool in exploring human facial attractiveness. Beauty increasingly appears to be ingrained in our biology: characteristics associated with evolutionarily relevant advantages for the choosing individual are perceived as attractive.

Individual differences in preferences can be consistent with evolutionary theory. It is important to note that the factors presented here may not necessarily be adaptive, rather they may be epiphenomenal to other cognitive mechanisms that are adaptive. While some aspects of face perception appear innate, other aspects are clearly influenced by experience; it seems unlikely that individuals are born with a representation

of what a perfect mate looks like. Hard-wired propensities to attend to face-like stimuli early in life provide the opportunity to learn the details of facial appearance, and hence experience will shape facial aesthetic judgements.

For humans, as with other species, there is no optimal strategy for mate choice and parenting that applies to all individuals. Indeed the range of personal circumstances (physical, environmental, social) will guarantee that what is a good or adequate strategy, and therefore what is attractive, will depend on the individual. It is hoped that consideration of this 'fine-grain' of attractiveness will help to put beauty back in the eye of the beholder.

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