

BEAUTY AND MATE CHOICE

What evolutionary biology can teach us

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We tend to regard beauty as the product of our education, the quintessence of cultural refinement, and we often emphasise the relative nature of beauty. That is why many find it shocking that the perception of beauty, especially human beauty, has a clear biological explanation, one that is largely independent from our education and culture. People are surprised because not only do the characteristics that define beauty originate in biology, but they are also universal and common to all members of our species.

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Beauty manifests itself in many different ways: in a landscape, music, or a mathematical theorem. But one type of beauty has been discussed more than any other: human beauty, the beauty of *Homo sapiens*, our own beauty. We often speak metaphorically of people's inner beauty, but the beauty we are most concerned about and interested in is, undoubtedly, outer beauty. Our body, and especially our faces, determine, to a certain extent, how others perceive us. In the United States, annual spending on personal beauty products surpasses spending on education or social services. A few years ago, the number of Avon saleswomen in Brazil was double the number of soldiers on active duty (Etcoff, 1999). Traditionally, beauty has been analysed from the point of view of art, philosophy, sociology, and culture, etc., but it has rarely been explored from a biological perspective. As far as beauty is concerned, some consider that biological explanations occupy a very low position in the explanatory hierarchy. Much to the contrary, evolutionary biology provides some of the most powerful tools to help us try to understand

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beauty. Social and cultural determinants are certainly important to understand our perception of beauty, but so is evolutionary biology and, more specifically, the theory of sexual selection formulated by Charles Darwin more than 150 years ago. Many of the traits we consider beautiful in humans and other animals have evolved as sexual signals designed to make their bearers irresistible to a potential sexual partner. Sexual selection thus, allows us to explain the existence of many of the traits we consider beautiful in nature: the scent and colour of flowers, the plumage and song of birds, the displays that many animals use as a prelude to mating, and even, according to some authors, music, poetry, and humour in our species (Miller, 2000).

■ THE PERCEPTION OF BEAUTY

There are two widespread misunderstandings regarding beauty. The first is that beauty is an intrinsic quality of the objects we consider beautiful.

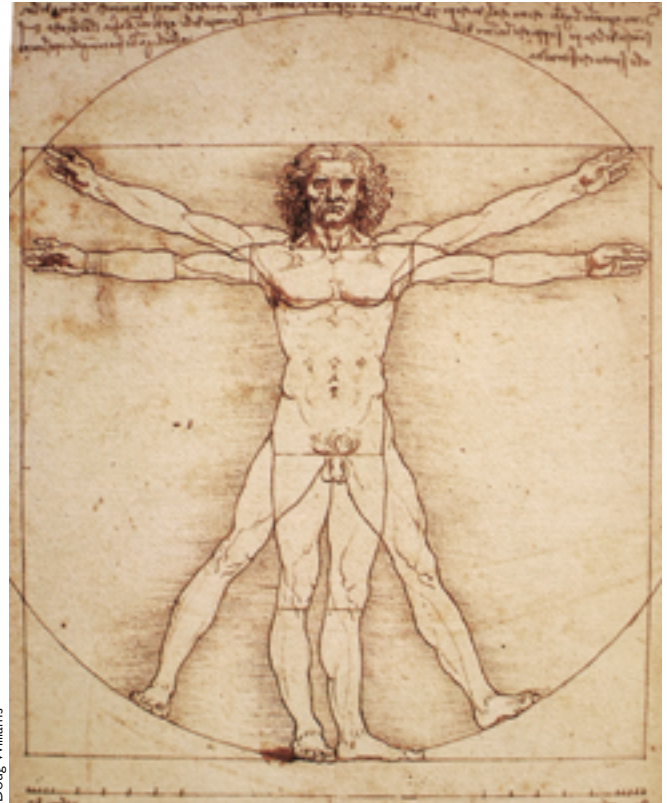
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This is similar to the problem posed by the definition of colour. Two elements are indispensable for the perception of colour: an object that emits, reflects, or transmits light of a certain wavelength, and a visual system (in the organism perceiving the object). Therefore, colour is not a physical variable like weight or height but rather, a psychophysical one. The light emitted, reflected, or transmitted by an object is, in principle, invariant, but because visual systems differ from one another, we cannot assume that our perception of colour is the same as that of other individuals, even within our own species. The problem is, of course, compounded when we compare our perception of colour with that of other species with visual systems that are very different from our own.

Like colour, the perception of beauty requires the participation of two elements: an object with particular characteristics and someone capable of perceiving them. It is said that beauty is in the eye of the beholder, i.e., that the perception of beauty is subjective so what looks beautiful to some may not look beautiful to others. That person we find irresistibly attractive may not be the subject of the same admiration in others. But if this is true for the human perception of beauty, it is even more true when we compare ourselves to different species. Our idea of beauty does not have to agree with that of a howler monkey, a woodpecker, or an ant. Beauty is actually in the eye of each species.

The other misunderstanding is that the perception of beauty is exclusively a product of learning, socialisation, and culture. According to this interpretation, canons of beauty – like fashion – would be fickle, variable, and strictly linked to a given socio-cultural context. These canons could change widely over time and across space and thus, a person we consider attractive might not be considered so in another time or part of the world. But the *eye* in the proverb (though it would be more correct to speak of the brain that analyses and interprets the information provided by that eye) was designed by natural selection. That is why, despite the differences undoubtedly imposed by culture, in essence, many of the criteria that lead us to perceive a certain person as beautiful are universal. In the 19th century, the poet Charles Baudelaire asserted that beauty is composed of an «eternal, invariable element» and a «relative, circumstantial element», the latter depending on «the age, its fashions, its morals, its emotions». The point is not to look for a simplistic dichotomy like «biology versus culture», but to recognise the importance of biology to better understand that «eternal, invariable element» of beauty. Thus, the canons of beauty are



Doug Williams

The *Vitruvian man* drawn by Leonardo da Vinci in 1492 was based on his own observations and on classical Greek texts describing the golden ratio that defines beauty. Evolutionist biology provides a new interpretation of beauty.

not arbitrary cultural inventions such as driving on the right-hand side of the road or the seven-day week (Grammer et al., 2003; Symons, 1995).

For instance, one trait that makes women attractive to men is a relatively slim waist. Men have proportionally narrower hips than women and their waist-to-hip ratio is around 0.9. In women, the ratio is more variable; when close to 0.7, it results in the typical hourglass silhouette. Numerous studies have shown that men find women with a waist-to-hip ratio value of around 0.7 particularly attractive (Singh, 1993). Such a preference for relatively slim waists manifests in men from both industrial and pre-industrial societies and is independent from whether women are relatively plump or thin: women with a 0.7 waist-to-hip ratio are considered more attractive in any weight category, although recent studies highlight that other variables such as body mass index also affect the perception of women's attractiveness (Singh et al., 2010; Singh & Singh, 2011). The fact that men from different cultures and ethnic groups agree in their evaluation of what they consider attractive in a woman is one of the main arguments in favour of the importance of biological factors in relation to beauty.

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Regardless of weight, women with a waist-to-hip ratio of 0.7 are considered more attractive than those with a different ratio. In men, the ratio is usually around 0.9. These proportions are reflected in Greek sculptures of the Hellenistic period, such as the Venus de Milo by Alexandros of Antioch or the Apollo Belvedere by Leochares.

Might the preference for thinner waists be just a whim unique to the current times? To answer this question, a recent study measured the waist-to-hip ratio in women that were considered beautiful (like Venus/Aphrodite) as depicted in paintings and sculptures from 500 BCE to the present day (Bovet & Raymond, 2015). To obtain data on more modern beauty symbols, the authors measured the waist-to-hip ratio of models in the centrefolds of *Playboy* magazine and the winners of international beauty pageants between 1921 and 2014. The underlying idea was that both the works of art and the models should conform to the ideal of beauty of each period and thus, allow us to assess the extent to which this ideal has changed over time. The results of the study were revealing: although the authors did detect small fluctuations in each period's ideal waist-to-hip ratio (for instance, a small decrease was detected from the 15th century to the present), the values remained roughly constant over the last 2,500 years at around 0.7.

Those who argue that beauty canons change over time often use Rubens's paintings to support the idea that, unlike nowadays, during the 16th and 17th

centuries, Europeans considered heavier women to be more attractive. However, there are studies that show that the preference for plump women was unique to Rubens and not shared by other Baroque artists. If Rubens's paintings represented the ideal of feminine beauty of the time, we could expect other artists from the same period to also choose larger women as models. Instead, most Baroque artists painted women who were very close to the current ideal of feminine beauty (Cloud & Perilloux, 2014). Furthermore, the literature of the time is consistent with this idea by describing women's slim waists as beautiful and attractive (Singh et al., 2007).

■ DARWIN, WALLACE, AND SEXUAL SELECTION

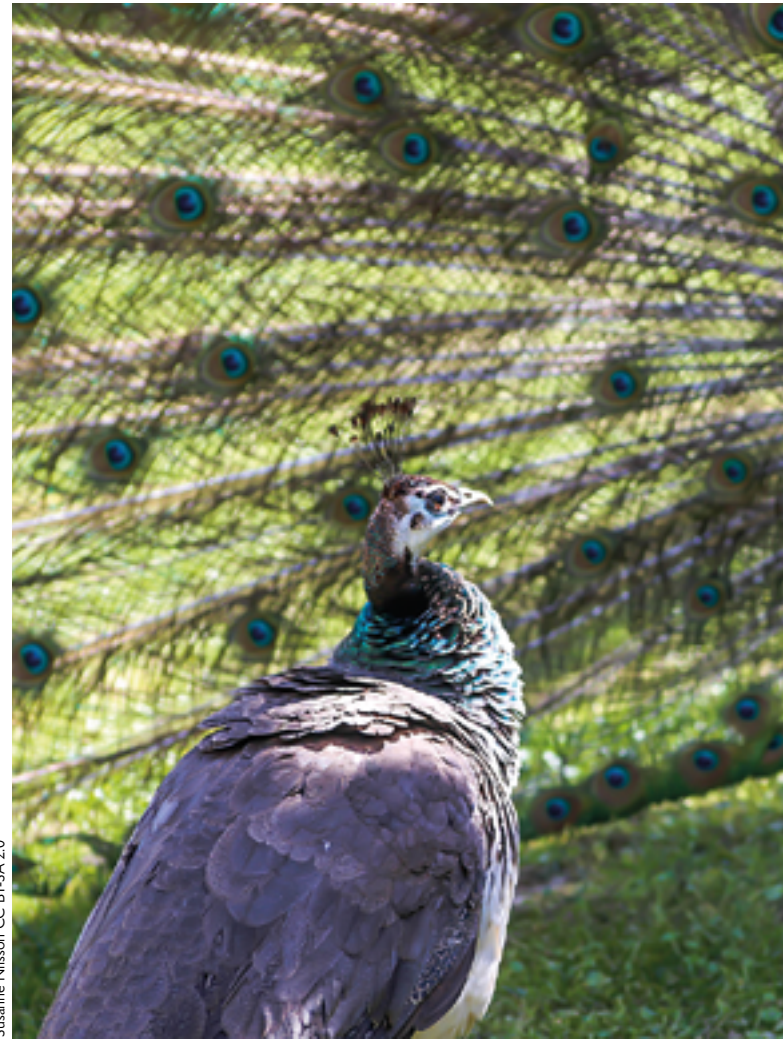
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The biological explanation of beauty has its origin, like most important ideas in biology, in the work of Charles Darwin. One of his best-known books, second only to *On the origin of species*, was *The descent of man*, published in two volumes in 1871. In this work, Darwin presented an extension to his theory of natural selection: sexual selection. With this new theory, Darwin sought to explain the evolution of traits such as deer antlers or the colourful tails of male peacocks, which do not seem to be beneficial to their bearers; rather, on the contrary, they constitute a clear hindrance to their survival. These traits are present in many sexually reproducing animals, especially in males, and their very existence challenges the theory of natural selection, which should not allow the evolution of traits that compromise survival, wasting time and energy, and making their bearers more visible to predators. Darwin's answer to this paradox was surprisingly simple, even though it took more than a century to gain widespread acceptance in the scientific community: these traits evolve because they give their bearers an advantage when looking for a sexual mate. One type of trait, armaments, were selected because they allowed males to compete with other males for females or for the resources needed to attract them (a territory, a hideout, etc.). This includes the claws, antlers, horns, and fangs of the males of many species. Another group of traits, ornaments, also evolved in the context of male competition, only this time indirectly: instead of fighting each other, males display themselves to females and try to be chosen over others (Darwin, 1871). The paradigmatic example of an ornament is the peacock's tail.

It is easy to understand why selection should favour males with the most effective armaments, but

what advantages do females gain by choosing more ornate males? The answer to this question confronted Charles Darwin and Alfred R. Wallace, co-discoverers of natural selection. Whereas Wallace believed male ornaments were useful from a natural selection point of view (and therefore doubted the need to invoke sexual selection to explain them), Darwin appealed to the aesthetic taste of females to explain their preferences. The idea that the females of all sorts of animals have the capacity to choose and that their aesthetic tastes can be a driving force in the evolution of male ornaments was one of the most controversial ideas in Darwin's work. Interestingly, the current theory of sexual selection incorporates elements from both Wallace and Darwin: females choose males that can provide them with material resources (e.g., food, protection, or a suitable place to lay eggs or care for their young), or that carry genes that increase the likelihood that their offspring will survive, mate, and have offspring, or that simply make them attractive to females. Because many of these male qualities are not directly observable, females rely on indicators that they can detect and compare (e.g., scents, colours, sounds, or movements). Ornaments are these indicators. Therefore, ornaments allow females to identify the best quality males, with whom they will eventually mate and produce offspring. The fact that other species' ornaments, such as the song or plumage of many birds, are attractive to us suggests that selection has operated on general design principles shared by all or most animals (e.g., conspicuousness, symmetry).

As presented by Darwin, the theory of sexual selection explained the consequences of female selection, but not its evolutionary causes. Darwin failed to provide a satisfactory explanation of why in most species males compete for access to females or are the ones that possess armaments and ornaments, while females are discreet, selective, demanding, and scrupulous regarding the advances of their suitors. There are many nuances, of course, and more than a few exceptions, but these too can be explained in the light of Darwinian theory. The key was found a century later by the American biologist Robert Trivers when he was still a student at Harvard University. All differences between males and females can ultimately be traced to an essential – a primordial – difference between the sexes: in most sexually reproducing species, females invest more in parental care than males (Trivers, 1972). Peacocks are a clear example of a species in which males contribute only sperm to reproduction. Males and females interact briefly during copulation, and from then on, all responsibility



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The exaggerated and exuberant plumage of the male peacock exemplifies the kind of traits that seemed to defy natural selection and forced Darwin to develop the theory of sexual selection. The picture shows a female peacock in front of a male courting her.

for the care of the offspring rests solely with the latter. In other species, the differences in parental care between males and females are not so great, and in some exceptional cases, it is the males that invest the most.

Differences in parental care produce an asymmetry in the potential reproductive success of males and females. This means that, in most species, a male can potentially produce much more offspring than a female, and so females become a limited resource for which males compete. Consider our own species: during the forty weeks of a woman's pregnancy, a man could, at least in theory, have offspring with dozens of different women. Unsurprisingly, the maximum number of descendants attributed to a single man (the 888 children of Moulay Ismail, Sultan of Morocco) is



«Natural selection has endowed us with the psychological mechanisms necessary to make decisions with adaptive value»

an order of magnitude greater than that of his female record-breaking counterpart (the 69 children born to Valentina Vassilyev, a Russian peasant, as a result of 27 pregnancies).

A common consequence of sexual selection in animals and plants is sexual dimorphism. Our species shows moderate sexual dimorphism in body size: on average, adult men are 7% taller than adult women (Font & Carazo, 2021). This suggests that the human species is not immune to sexual selection, although we do have certain peculiarities. To begin with, many men devote time and energy to parental care, although there is a lot of variability in this: some men are hardly

involved in the care of their offspring, while others are attentive and dedicated fathers. But the average human male contribution to parental care is much higher than that of any male peacock. However, peacocks are a borderline case: in most bird species, both males and females contribute to the care of the young. Hence, some authors claim that humans are mammals with the parental care typical of many bird species.

Another characteristic that humans have in common with many birds is the formation of more or less stable or exclusive pair bonds. The combination of pair bonds and biparental care is probably responsible for the fact that, in our species, mate selection is mutual: both males and females show clear preferences for partners with certain physical or behavioural characteristics (Stewart-Williams & Thomas, 2013). In most species, males compete with each other, and the female selects a mate; consequently, the males have armaments and ornaments. In our species, both sexes are selective and compete with members of their own sex for access to the best mates. Both men and women possess ornaments that make us attractive in the eyes of the other sex.

For evolutionary biology, sex differences are not at all surprising. Often, what benefits one sex is not necessarily what benefits the other. Where this is the case, selection may favour the emergence of different traits in males and females. One of the most striking findings of evolutionary psychology, an emerging discipline that studies human behaviour from an evolutionary perspective, is that men and women differ in the type of characteristics we value most in a potential partner. At least when it comes to establishing a long-term relationship, both men and women look for a partner who is intelligent, fun, loving, and concerned about our well-being and that of our common offspring. Other traits, such as physical attractiveness («good looks»), are also important, but – and here is the interesting thing – men and women do not give them the same priority: men value the physical attractiveness – the beauty – of a potential partner much more than women do (Buss, 2016). This does not mean that women do not value beauty in their partners or that men base their preferences solely on physical appearance. But, on average, men pay more attention to the physical attractiveness of their partners than women do. Interestingly, the preferences of gay and lesbian individuals tend to coincide with those typical of their biological sex. Gay men attach as much importance to the physical attractiveness of their partners as heterosexual men, while lesbian women have the same kind of preferences as heterosexual women (Kenrick et al., 1995).

■ EVOLUTIONARY AESTHETICS

So, what traits make a woman attractive? Available evidence suggests that the traits responsible for making women attractive are common to different cultures and ethnic groups (Coetzee et al., 2014; Cunningham et al., 1995; Langlois et al., 2000). Men tend to prefer women with full lips, flawless skin, light eyes, long lustrous hair, perky breasts, facial and body symmetry, long legs and, of course, a waist-to-hip ratio close to 0.7. Why precisely these traits and not others? The answer from evolutionary psychology is clear: because, in general, these are indicators of health, fertility, and genetic quality. Throughout our evolutionary history, those of our ancestors who mated with females with these traits had, on average, greater reproductive success than those who mated with females with alternative traits. The traits that make them attractive to men are, statistically speaking, good indicators of the quality and quantity of offspring that women might provide for their partners (Cloud & Perilloux, 2014). Other traits, such as elbows or forearm length, are not.

Both a woman's fertility and her reproductive potential (the number of descendants she is likely to have during the rest of her life) are closely linked to her age, and both decline rapidly in her twenties and beyond. In addition, most women reach menopause between the ages of 45 and 55. That is why a man who wishes to have many descendants would do well to choose a young partner, even if she is much younger than he is. Some of the traits that make women attractive, like that waist-to-hip ratio of 0.7, allow men to identify young and therefore fertile mates with high reproductive potential without having to check their birth certificate. Fertility in men is not as closely linked to age, which is why women do not value the youth of their partners as much as men do; in fact, many women prefer an older partner. Nevertheless, menopause is not a universal phenomenon. In chimpanzees, for example, older females are still able to procreate. Accordingly, male chimpanzees do not have a sexual preference for younger females (Muller et al., 2006). In fact, our preference for young females is a rarity among primates.

Obviously, when we are attracted to someone it is because we like them, because they excite us, and their presence activates certain neural circuits and hormonal secretions in us. It is not because we have concluded, through careful biometric study, that pairing up with that person will increase our reproductive success. However, interactions between individuals of different sexes are highly likely to have reproductive consequences, and sexual selection acts precisely on those consequences. It is not necessary to understand



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In our species, both sexes are selective and compete with members of their own sex for access to the best mates. Both men and women wear ornaments to make themselves attractive to potential mates.

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the evolutionary logic of our sexual preferences for them to do their job. Natural selection has endowed us with the psychological mechanisms necessary to make decisions with adaptive value, not to understand why those decisions have adaptive consequences.

The sexual preferences of all kinds of animals bring us closer to their particular idea of beauty. These preferences are not, generally speaking, the product of learning or culture. They are the product of natural selection. There will always be someone willing to dismiss an evolutionary explanation by arguing that our sexual preferences are the logical consequence of learning and culture. But it would be very strange for our species to be the only one on Earth whose behaviour has not been affected by the evolutionary process and by sexual selection. In fact, studies show that, when given a choice, children as young as a few months of age already exhibit a clear preference for the same faces that adults find attractive, before learning, socialisation, or culture can have any effect (Langlois et al., 1991).



Vanity Fair

When it comes to establishing a long-term relationship, men value the physical attractiveness – the beauty – of a potential partner much more than women do. Women, on the other hand, value the social status and financial prospects of their partners more than men. In 1994, David Buss, one of the pioneers of such studies, used a reproduction of the cover of *Vanity Fair* to illustrate this asymmetry. This was the first time many of us heard of Donald Trump.

The fact that our preferences for partners with certain characteristics are relatively constant in space and time and conform to the predictions of sexual selection reinforces the idea that the canons of beauty are not merely a cultural invention. The canons of beauty are part of human nature. ☺

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