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Human physical attractiveness as a biological signal

Introduction

Opinions about human beauty (attractiveness) may come as a surprise when expressed by a biologist, all the more so because this seems to be a matter of an individual sense of aesthetics (taste), which changes in time and space, and depends on fashion, local culture, social class, etc. No one is surprised, however, to hear a biologist interpreting the behaviour of animals with regard to their appearance, for example in the mating season. Why, then, should human biology (physical anthropology) not deal with such links in people?

Given the vast nature of the subject, the not always consistent results of studies into various populations and cultures as well as the variety of possible interpretations with regard to evolutionary biology, the present article examines only the most typical features of the attractiveness of the human body. Similarly, the author limits himself to listing the most frequent explanations of their biological, especially evolutionary, significance. He emphasises the role of the features which are indicators of physical health and predictors of fertility. In addition, he takes into account various age categories and sex-specific differences. He briefly discusses the most important physical characteristics such as height, weight and body proportions, some details of the face and hands, pigmentation of the skin, hair and even voice timbre.

Is there a universal canon of beauty of the human body?

Already in Antiquity artists (e.g. Polykleitos, Lysippos) looked for rules (canons) of the beauty of the body. They looked primarily for a measure (*modulus*)

expressing the proportions of the body, which was to facilitate rendition of the proportions of figures portrayed in paintings or sculptures[1]. One of the most interesting and most detailed is Cennino Cennini's canon included in his book *Il libro dell'arte*. Born around 1370 near Florence, Cennini painted his works in Padua. He did not know the ancient canons of proportions, so his work was ground-breaking in a way, and became an inspiration for many later great masters of the Renaissance who looked for a canon of proportions. Cennini included a detailed description of the canon[2] in chapter seventy: "The proportions which a perfectly formed man's body should possess". In addition to the fragments quoted below and describing the proportions of the body, there are also other remarks, testifying to his poor knowledge of human anatomy, or statements that today could surprise or even offend readers (especially women). Here are selected fragments from the chapter:

> ...I will give you the exact proportions of a man. Those of a woman I will disregard, for she does not have any set proportion.
> ... the face is divided into three parts, namely: the forehead, one; the nose, another; from the nose to the chin, another.
> A man is as long as his arms crosswise [...] The whole man is eight faces [...]
> A man has one breast rib less than a woman, on the left side. A man has .... bones in all[3].
> He also must have his member, that is his rod of a size that is pleasant to women; let his testicles be small, beautiful looking and fresh.
> The handsome man must be swarthy, and the woman fair.

Does contemporary knowledge allow us to accept some universal canon of beauty of the human body? Universal both in terms of the temporal and spatial (geographic) dimension? It seems that in the case of most morphological features of human beings the question can be answered in the affirmative. This is so because features of appearance (just as almost all other features) have evolved over time, i.e. they are a kind of adaptation (genetic adaptation). Attractiveness of the body in this case serves mainly to maximise reproductive success. Features determining attractiveness undoubtedly make it possible to attract a partner's attention and are the most important criterion of establishing the first relation with a new partner. Thus they serve as an honest biological signal, because they make it possible to assess the partner's biological attractiveness[4]. In the case of children they may determine the quality of care, the so-called parental investment[5].

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[1] See M. Čabrić, L. Pokrywka, *Piękno ciała*, Warsaw 2010.

[2] See: J. Mydlarski, "Kanon proporcji ciała ludzkiego a przełomu XIV i XV wieku", *Przegląd Antropologiczny* 23, 1956, pp. 21-23.

[3] This is how it is written originally — Cennini did not know what number to put on the dotted line.

[4] See B. Pawłowski, "Atrakcyjność fizyczna człowieka jako multimodalny sygnał biologiczny", [in:] *Biologia atrakcyjności człowieka*, ed. B. Pawłowski, Warsaw 2009, pp. 293-304.

[5] See I. Sukiennik, B. Pawłowski, "Biologiczne znaczenie atrakcyjności cech dziecięcych", [in:] *Biologia atrakcyjności…*, pp. 46-64.

Although it may seem otherwise, the basic canons of beauty across the world are similar[6], which can be seen, for example, in the Miss World contest. Women selected during the contest are liked by everybody, regardless of the ethnicity, culture and current fashion, age and even sex of a jury member.

Biological cost of attractiveness

Attractiveness-related features are usually biologically "expensive". The cost is most often incurred by males. Rich sexual ornamentation in animals (e.g. the peacock) or strongly masculinised male features require a high testosterone level, which in the longer term has a negative impact on the immune system (acts as immunosuppressant) and increases the risk of attack by predators. In the case of men, it may increase the risk of body damage or even death due to aggression or risky behaviour, as such men like to show off. Thus, highly attractive appearance and/or behaviour require a very good biological condition[7]. Masculinisation is, in a way, a luxury — not every man can afford it.

It turns out that human attractiveness can be analysed not only in a reproductive (sexual) context. Being attractive is advantageous, because people who look attractive find better jobs more easily, are more successful at work, get promoted more easily and get better salaries, receive milder sentences or lower fines, go through the various stages of education more easily, have more friends and achieve their goals more easily. They also consider themselves to be in better health and more often than others say they are happy. This can be explained relatively easily. Watching beautiful objects, works of art etc. as well as attractive individuals (especially their faces) releases specific brain waves in the observer's brain and activates the so-called reward system.

Features that determine facial attractiveness

One of the most important features in perception of attractiveness is symmetry (especially of the face). Most animals are genetically "programmed" to develop symmetry, but in the hierarchy of importance symmetry is ranked quite low. It is not as important as, for example, the right pace of growing or maturing. Thus, if a developing organism is subjected to the influence of factors that prevent full satis-

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[6] See M. Čabrić, L. Pokrywka, op. cit.

[7] See D. Danel, *Stopień maskulinizacji twarzy męskich jako wskaźnik atrakcyjności w kontekście wybranych parametrów jakości partnera w ocenie kobiet*, PhD thesis 2008, University of Wrocław.

faction of all its needs, development of symmetry is pushed to the background. In the world of animals symmetry is thus a universal signal of good biological quality (health, lack of parasites, eating well, good developmental conditions, etc.). On the other hand, asymmetry signals developmental instability and poorer biological quality[8]. Increased asymmetry is hugely important in sexual selection. Symmetrical individuals are objectively healthier and are also perceived as healthier and more attractive. There is also a negative correlation between asymmetry and self-assessment of health and a positive correlation with the number of appointments with a doctor. This mainly concerns the face, as the face probably has the biggest impact on the perception of general physical attractiveness of a human being. We are dealing here with a very high intercultural concordance. One glance (13 ms) is enough to assess the attractiveness of a face.

In addition to the intensity of asymmetry, facial attractiveness is also influenced by the values of facial measurements. An attractive face is an average (which does not mean ordinary) face, i.e. a face with average values (for a given population) of anthropometric features. This applies to both sexes. "Averageness" signifies developmental stability, heterozygoticity, good functionality of facial organs (masticatory system and nasal cavity).

Another indicator of facial attractiveness is the degree of feminisation in women and degree of masculinisation in men. These features have a high positive correlation particularly in women[9]. The degree of feminisation of a woman's face is an indicator of the woman's age. This is determined by features like skin and hair colour as well as the mouth (which will be described in greater detail later on). They are to signal youth and, at the same time, reproductive maturity[10]. They are unique markers of a high reproductive potential and a "certificate" of reproductive maturity — hence the name of oestrogenic indicators of youth, which include red (!), full, prominent and firm mouth, smooth, flexible skin, and a lack of any facial hair.

Particularly attractive to most men seem to be female faces with somewhat infantile (child-like) features, which make them "younger". These are: a high and broad forehead, large, wide-spaced eyes, a small nose, a prominent vermilion zone, fair hair, a smaller lower part of the face and a small chin.

In the case of masculinisation of male faces the problem is more complex and the results of research are not as unequivocal as they are in the case of women[11].

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[8] See D. Danel, B. Pawłowski, "Biologiczne znaczenie atrakcyjności twarzy", [in:] *Biologia atrakcyjności…*, pp. 166-205.

[9] See N. Koehler *et al.*, "The relationship between sexual dimorphism in human faces and fluctuating symmetry", *Proceedings of the Royal Society B: Biological Sciences* (suppl.) 271, 2004, pp. 233-236.

[10] See G. Rhodes, C. Hickford, L. Jeffery, "Sex-typicality and attractiveness: are supermale and superfemale faces super-attractive?", *British Journal of Psychology* 91, 2000, pp. 125-140.

[11] See ibidem.

This is caused by the fact that women's preferences are changeable[12] and depend on:

— the phase of the menstrual cycle: men with more masculinised faces are preferred by women in the "fertile" phase of the cycle, which stems from a subconscious desire to ensure "good genes" from a masculinised father for the offspring;

— the sexual strategy; in a short-term strategy the men most attractive to women are strongly masculinised ones, but in long-term strategies this is not the case. Less pronounced masculinisation means an inclination to high parental and partner investments. Interestingly, small scars in men are regarded as attractive, but this applies only to brief relationships.

As has been mentioned earlier, strong masculinisation is energy intensive and requires a high testosterone level. As a high testosterone level is harmful to the immune system, not all men can afford it. This for women choosing a partner means a compromise between a possibility of ensuring good father's genes for the offspring and a high parental and/or partner investment. That is why men regarded as attractive do not have to be strongly masculinised, if they are chosen "for life".

Skin colour is a much more important factor in the perception of attractiveness in women than in men. Fair skin is greatly preferred in women, for fair skin absorbs UV radiation more easily and this is important in natural vitamin D synthesis (important to foetal development), it facilitates observation of some diseases (mainly anaemia) and signals of interest in a partner (blushing) as well as discolouration (indicator of age and health). This was noted by many master painters in the past, e.g. the already mentioned Cennini ("The handsome man must be swarthy, and the woman fair"). The attractiveness of female skin is increased by a light touch of red (sign of a good circulation). Darker skin colours are preferred in men, but this feature is much less important than in women[13].

Men prefer fair hair (blonde) in women. As has been mentioned earlier, this infantile feature "lowers" the age, triggers protectiveness, but also (just like fair skin) facilitates the absorption of UV rays[14]. Interestingly, despite the fact that the "silly blonde" stereotype functions in many societies, blondes tend to earn more on average, get promoted earlier, are more easily forgiven, etc. than brunettes[15]. In both sexes the least attractive hair colour is red.

Hair length is in many cultures an important element of female attractiveness. Longer hair is preferred, which may be connected with the fact that long hair facilitates the emission of pheromones associated with attracting a partner. This may

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[12] See V.S. Johnston, "Mate choice decisions: the role of facial beauty", *Trends in Cognitive Sciences* 10, 2006, no. 1, pp. 9-13; D. Danel, op. cit.

[13] See P. Srokowski, "Pigmentacja i owłosienie a atrakcyjność fizyczna", [in:] *Biologia atrakcyjności...*, pp. 206-231.

[14] See ibidem.

[15] See P. Srokowski, "Attractiveness of blonde women in evolutionary perspective: studies with two Polish samples", *Perceptual and Motor Skills* 106, 2008, pp. 737-744.

also be the reason why in many cultures hair of married women is "preventively" cut, while unmarried women show off their long hair by wearing it loose. In men darker, rather short hair is preferable. What is attractive to women is moderate (two-day) stubble, which increases facial masculinity. Baldness greatly lowers attractiveness[16]. When it comes to body hair, there are no reliable studies yet.

In both sexes the preferred eye colour is blue. What is also important is the area around the eye, which is a good indicator of youth. Interestingly, most respondents begin their assessments of facial attractiveness from the eyes.

Features that determine bodily attractiveness

One of the most important indicators of bodily attractiveness (especially in men) is body height. The attractiveness of men increases almost linearly with their height, but only within the 173-193 cm range; after that it decreases. The optimum value is 183-185 cm. However, these values are characterised by an inter-population variability and we can assume that an attractive height in a given population is one that corresponds to average values. It turns out that tall men also have more attractive female partners. A man's height that is lower than expected in a given community may be "compensated" by a thick wallet, high IQ or high social standing, particularly with regard to a long-term strategy. Height has little impact on the perception of women's attractiveness — average values are optimal, with 4-10% being the difference in the height between a man and a woman preferred by both sexes. This is a canon more "universal" than absolute body height[17].

The attractiveness of a female body is determined by two main factors — amount of fat and the waist-to-hips ratio[18]. Do men really prefer slim women? Fatty tissue in women is a kind of "store" of oestrogens and so is directly associated with their fertility. In addition, fatty tissue produces leptins — which also stimulate fertility. Today the most often used index in fat measurements is BMI (*body mass index*) defined as the body mass (kg) divided by the square of the height (m). Correct BMI values in women are within the 19-25 range; values between 25 and 30 signify that a woman is overweight, while those over 30 — that she is obese. Female attractiveness with regard to the BMI differs, depending on ecological conditions (population), usually within the optimum range; however, women with a BMI of over 30 are not perceived as attractive. The situation is

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[16] See P. Srokowski, "Pigmentacja i owłosienie..."

[17] B. Pawłowski, "Wysokość i długościowe proporcje ciała a atrakcyjność człowieka", [in:] *Biologia atrakcyjności*..., pp. 66-109.

[18] See M. Rozmus-Wrzesińska, B. Pawłowski, "Atrakcyjność względnej masy i kształtu ciała", [in:] *Biologia atrakcyjności*…, pp. 110-155; M. Čabrić, L. Pokrywka, op. cit.

similar in the case of women who are too thin. However, being slightly over-weight (25-30) scores better than being underweight (< 17). A higher BMI also signals older age; in addition, the higher the BMI, the greater the asymmetry.

The waist-to-hips ratio (WHR) is the ratio of the circumference of the waist to the circumference of the hips. The WHR regarded as correct and the most attract-ive in women is 0.7. A raised WHR signals older age, incorrect hormonal profile, lack of exercise and nutrition problems[19]. And, first of all, pregnancy. A pregnant woman is not attractive to potential new partners.

In men this indicator is of little significance. From the point of view of body shape attractiveness, an optimum WHR in men is 0.8-0.9. There is a weak correla-tion between the attractiveness of a male body and body fat. Body attractiveness is much more strongly linked to muscle mass. The "clearest" signal in men is their waist-to-shoulder ratio (WSR) or their shoulder-to-hip ratio (SHR). Women prefer moderately muscular men with relatively broad shoulders, though their preferences also depend on the phase of the menstrual cycle and sexual strategy — short- or long-term.

Breast size is, contrary to expectations, a weak signal and one that is strongly culturally-determined. What matters more is the firmness of the breasts, which undoubtedly indicates age.

An important feature in an assessment of attractiveness (primarily of women) is the shape and appearance of the hand. The attractiveness of the hand is highly correlated with the attractiveness of other features and in both sexes depends on: slenderness (mainly of the fingers), fat (correlated with, among others, the BMI), condition (smoothness) of the skin, state of the nails (which depends on many diseases) and length of the nails.

Interestingly, voice pitch is correlated with other, previously analysed features. In men the correlation is linear — the lower the voice, the more attractive the man (this is possible with a high testosterone level). In women it is the other way round — a higher voice is more attractive, but only to about 280Hz. A voice higher than that sounds infantile, suggesting sexual immaturity[20].

Ideal or manipulation?

The above description suggests that an ideal woman has a smooth, fair skin, full, red lips, long, fair and shining hair, slightly child-like physiognomy, narrow waist (WHR around 0.7), symmetrical body (mainly the face) and right amount of

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[19] See D. Singh, A. Sing, "Role of body fat and body shape on judgment of female health and attractiveness: an evolutionary perspective", *Psychological Topics* 15, 2006, no. 2, pp. 331-350.

[20] See D. Gajda, B. Pawłowski, "Biologia atrakcyjności głosu i śmiechu", [in:] *Biologia atrak-cyjności…*, pp. 232-261.

body fat (BMI around 19-20). It is more difficult to describe an ideal man, for this assessment is done by women, whose preferences (as has been noted earlier) are changeable, depending on, among others, the phase of the menstrual cycle. However, it must be stressed that the signalling of the individual biological potential is closer to reality, more honest in men than in women. It seems that women tend to cheat (more or less consciously) more often, masking or changing the features that constitute their signal. They increase the length of their legs by wearing high heels, put on corsets to lower their WHR, paint their lips red, powder their cheeks, dye their hair to mask any existing faults, remove their body hair and use perfumes to mask the emission of their natural pheromones.