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## DARWIN'S PROBLEM: EVOLUTIONARY AESTHETICS AND THE SENSE OF BEAUTY

Humans tend to judge and sort parts of their social and non-social environment permanently into a few basic categories: those parts they like and those parts they don't. Indeed we have developed aesthetic preferences for those things and people we are exposed to. And, needless to say, these preferences shape our behavioural choices – our tendency to seek out or avoid what the world has to offer to us. Humans and other animals have evolved preferences for food and habitats, for naturally occurring sensations like smells and sounds, as well as for the broad array of culturally created artefacts.

Last but not least, humans have also evolved aesthetic preferences for their sexual and social companions. Here we will review the current approaches in attractiveness research, and deal with the obsession about beauty. We review the biological constraints which create the bases for beauty traits as honest mating signals. If evolutionary approaches to beauty are correct, beauty signals should have a direct relation to health, and reproductive success.

The pillars of beauty identified up to now are averageness, symmetry, and sex-hormone markers, which find their expression in form, skin texture, body motion, body odour, voices and hair complexion. We suggest that the content of these signals is redundant, and points in the same direction.

*Keywords:* aesthetic preference, sexual behaviour, attractiveness, beauty, honest mating signals.

Humans tend to judge and sort their social and non-social environment permanently into a few basic categories: "likes" and "don't likes". Indeed we have developed general preferences for our social and non-social environment. These preferences can be subsumed under the term "evolutionary aesthetics [Volland & Grammer, 2003].

Humans and animals have evolved preferences for mates, food, habitats, smells and objects. Those stimuli that promoted reproductive success are bound to positive emotional feelings towards them, and humans develop an obsession-like attitude towards aesthetics and beauty. Although we "are all legally equal", people are often treated differently according to their physical appearance. This differential treatment by others starts early in life. Three-month-old children gaze longer at attractive faces than at unattractive faces. From these results Langlois, Roggman, and Reiser-Danner (1990) conclude that beauty standards are not learned but that there is an innate beauty detector. Attractive children receive less punishment than unattractive children for the same types of misbehavior. Differential treatment goes on at school, college and even university [Baugh &

Parry, 1991]. In this part of our lives attractiveness is coupled to academic achievements - attractive students receive better grades. Even when we apply for jobs, appearance may dominate qualification [Collins & Zebrowitz, 1995]. This differential treatment reaches its culmination perhaps in the judiciary, where attractiveness can lead to better treatment and easier convictions. However, this is only the case, if attractiveness did not play a role in the crime [Hatfield & Sprecher, 1986].

We even believe that attractive people are better – "what is beautiful is good" is a common standard in our thinking according to Dion, Berscheid and Walster (1972).

This raises the question: Where does this obsessive preoccupation with beauty and attractiveness come from? We will outline here that human mate selection criteria, which have evolved through human evolutionary history, are responsible for the shaping of our perception of attractiveness and beauty.

### Darwin's problem

Darwin himself had already promoted this idea and laid the foundation to any theoretical

development in this direction. In regard to a general sense of beauty Darwin writes in the "Descent of Man": "... *This sense has been declared to be peculiar to man. I refer here only to the pleasure given by certain colours, forms, and sounds, and which may fairly be called a sense of the beautiful; with cultivated men such sensations are, however, intimately associated with complex ideas and trains of thought.* " and ... " *Why certain bright colours should excite pleasure cannot, I presume, be explained, any more than why certain flavours and scents are agreeable; but habit has something to do with the result, for that which is at first unpleasant to our senses, ultimately becomes pleasant, and habits are inherited. With respect to sounds, Helmholtz has explained to a certain extent on physiological principles, why harmonies and certain cadences are agreeable. But besides this, sounds frequently recurring at irregular intervals are highly disagreeable, as every one will admit who has listened at night to the irregular flapping of a rope on board ship.*" And further on "The same principle seems to come into play with vision, as the eye prefers symmetry or figures with some regular recurrence. Patterns of this kind are employed by even the lowest savages as ornaments; and they have been developed through sexual selection for the adornment of some male animals. " and "Whether we can or not give any reason for the pleasure thus derived from vision and hearing, yet man and many of the lower animals are alike pleased by the same colours, graceful shading and forms, and the same sounds" [Darwin, 1871. P. 99].

Darwin already mentions all principles, which are employed to explain aesthetic perception today. Although Darwin had grasped the basic principle, he had no explication for the sense of beauty in animals and man, and when reading the "Descent of man" the reader finds Darwin wandering in between the assumptions that evolution must have worked on aesthetic preferences in both animals and humans, and a general cultural variation of these aesthetic preferences. After reviewing the evidence he had at this time, he came to the conclusion: "*It is certainly not true that there is in the mind of man any universal standard of beauty with respect to the human body. It is, however, possible that certain tastes may in the course of time become inherited, though there is no evidence in favour of this belief: and if so, each race would possess its own innate ideal standard of beauty.*

*It has been argued that ugliness consists in an approach to the structure of the lower animals, and no doubt this is partly true with the more civilised nations, in which intellect is highly appreciated; but this explanation will hardly apply to all forms of ugliness. The men of each race prefer what they are accustomed to; they cannot endure any great change; but they like variety, and admire each characteristic carried to a moderate extreme.) Men accustomed to a nearly oval face, to straight and regular features, and to bright colours, admire, as we Europeans know, these points when strongly developed. On the other hand, men accustomed to a broad face, with high cheek-bones, a depressed nose, and a black skin, admire these peculiarities when strongly marked. No doubt characters of all kinds may be too much developed for beauty. Hence a perfect beauty, which implies many characters modified in a particular manner, will be in every race a prodigy. As the great anatomist Bichat long ago said, if every one were cast in the same mould, there would be no such thing as beauty. If all our women were to become as beautiful as the Venus de Medici, we should for a time be charmed; but we should soon wish for variety; and as soon as we had obtained variety, we should wish to see certain characters a little exaggerated beyond the then existing common standard" [Ibid. P. 581].*

Today, within cultures the generality of attractiveness is easily accepted. Several rating studies, especially those by Iliffe (1960) have shown that people of an ethnic group share common attractiveness standards. In this standard, beauty and sexual attractiveness seem to be the same, and ratings of pictures show a high congruence over social class, age and sex. Thus it seems to be a valid starting point when we state that beauty standards are at least shared in a population. Moreover, recent studies [Cunningham, Roberts, Wu, Barbee & Druen, 1995] suggest that the constituents of beauty are neither arbitrary nor culture bound. The consensus on which females are considered to be good-looking or not, is quite high in four cultures (Asian, Hispanic, Black and white women rated all by males from all cultures). Thus Darwin was not completely right in his argumentation on the possible uniformity of beauty perception in respect to the human body.

Nevertheless, we find Darwin arguing that aesthetic principals in human perception are a result of sexual selection (p. 583): "*We must next inquire whether this preference and the consequent*

*selection during many generations of those women, which appear to the men of each race the most attractive, has altered the character either of the females alone, or of both sexes. With mammals the general rule appears to be that characters of all kinds are inherited equally by the males and females; we might therefore expect that with mankind any characters gained by the females or by the males through sexual selection would commonly be transferred to the offspring of both sexes” [Darwin, 1871. P. 583].*

Why did Charles Darwin come to this somewhat fuzzy conclusion? With the information he had, the conclusion was surely right. He had asked missionaries and ethnographers to describe the beauty standards of different ethnic groups, resulting in a diversity of answers that made a generalization difficult. Even today, we might accept Darwin’s conclusions considering the wide diversity of human appearances. Even more than 100 years later, it still seems obvious for some researchers that beauty standards are culturally determined. As an example Grogan (1999) points out that beauty standards vary highly over time and history and between (and even within) societies. This high degree of cultural relativism culminates in the following statement: *“Evolutionary psychologists have failed to demonstrate convincingly that preferences for particular body shapes are biologically based.... Current data suggest that body satisfaction is largely determined by social factors, and is intimately tied to sexuality”*. Grogan seems not to be aware of the fact that sexuality is closely tied to reproduction, thus she fails to connect her ideas with biology.

This line of argumentation would represent a lack of scientific progress since the times of Darwin. From a biological point of view, human sexuality is linked to human reproduction and thus prone to evolutionary determined constraints. Although we have to admit that beauty standards might be different between cultures and between times, we will show in this article that the underlying constraints, which shaped the standards, are the same, and that these constraints may be of an evolutionary origin.

Darwin’s inability to explain the foundations of aesthetic preferences was resolved by modern evolutionary theories. It was only until the sixties of the last century that the general theoretical foundation for the explanation of our aesthetic preferences emerged.

It was Konrad Lorenz who laid the foundation for a deeper understanding of the possible mechanisms responsible for our aesthetic preferences. The first idea is connected to the fact that the cognitive apparatus of humans evolved to fit the actually present physical structures and that our thinking and reasoning are a result of evolution. This means that the cognitive structures we have are adaptations to problem solving in the past. Those brains – or cognitive algorithms – that were able to process the information from our environment more efficiently, were those that were selected in the course of evolution. But Lorenz went further – he argued that in the course of evolution certain environmental stimuli, which promoted reproductive success, were connected to positive emotional reactions [Lorenz, 1973].

His idea has recently gained increasing attention from the scientific discipline called evolutionary psychology<sup>4</sup>. Based on Lorenz’ adapted mind theory, Cosmides and Tooby (1992) propose that our brains have domain specific cognitive structures, which evolved in order to process everyday information efficiently and assess its impact concerning reproductive success. Are there any hints that we have such domain specific adaptations in reasoning regarding to aesthetic principles? When Aharon and al. (2001) showed photographs of attractive and unattractive people to males, they could show that in all males the same regions of the brain were active when seeing attractive faces.

### **Evolutionary constraints on aesthetic perception: the body as an evolved form**

If adaptations to the perception of beauty and for aesthetic preferences exist in the form of specialized modules of the mind [Cosmides and Tooby, 1992] they should have been shaped by evolutionary constraints affecting reproductive success. Host-parasite-coevolution [Hamilton and Zuk, 1982] predicts that parasite resistance should be a valued trait in mate selection. One means to fight against parasites is the creation of a high degree of polymorphism: When a parasite adapts to one genetic allele, alternative alleles may be advantageous for resistance. Pathogens are the major environmental perturbations leading to developmental instability – and developmental stability may be related to high genetic variance and disease resistance, which in turn may relate



to fitness. When a signal system of fitness evolves one problem arises: The possibility of deception. Individuals might exploit the presence of attractive signals by sending them without possessing the underlying qualities, i.e. fitness. This way the information value of such signals would be lost. The result of this is the evolution of honest signals, which can only be produced under specific conditions. Zahavi & Zahavi (1997) propose that the honesty of signals might be triggered by a handicap. This means that the generation of the signal itself is costly and imposes a handicap on the signal bearer.

For instance the attractive broad jaw in males could signal an immune handicap. This is the only male facial feature where a positive correlation with attractiveness has been replicated in several studies: “wide jaws and big chins” and generally bigger lower faces make a male face more attractive [Mueller & Mazur, 1997; Grammer & Thornhill, 1994]. This is the case because maintaining high levels of testosterone – which are necessary for the production of these properties - might be costly. Testosterone suppresses the functionality of the immune system and thereby increases disease susceptibility during puberty [Folstad & Karter,

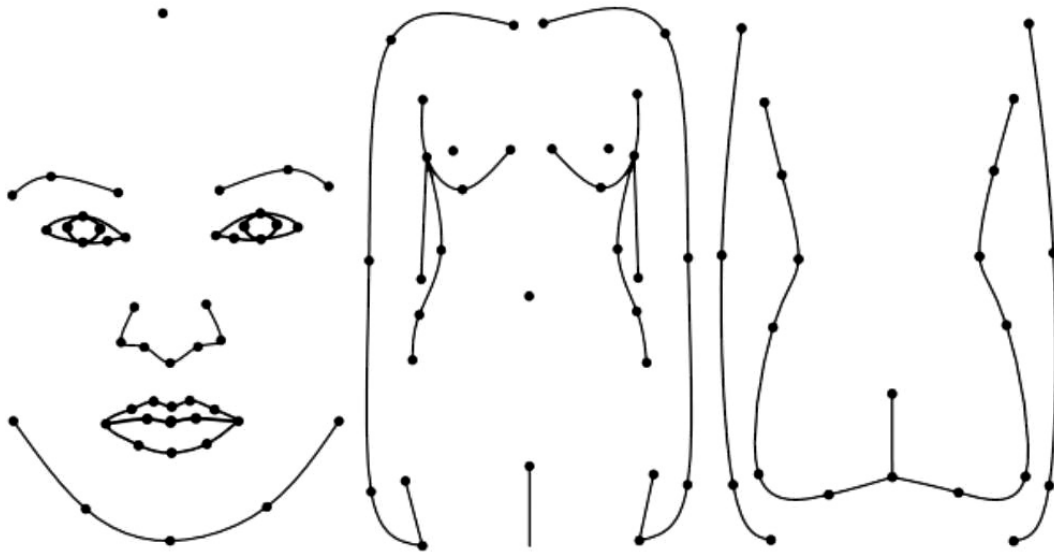


Fig. 1. Averages of landmarks from female faces and bodies calculated with modern geometric morphometric methods. Averages usually are more beautiful than the single parts constituting them (From [Schaefer et al., 2006])

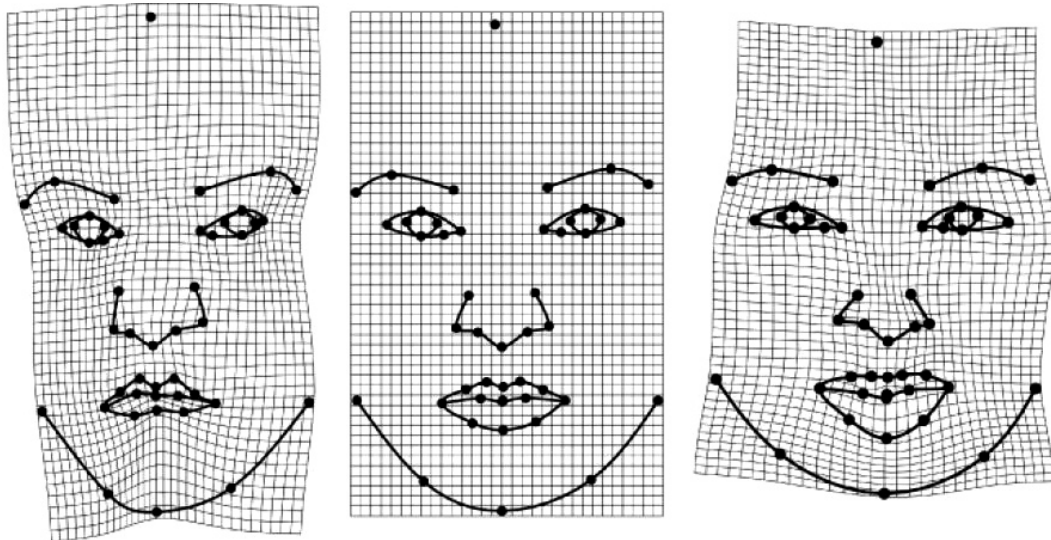


Fig. 2. Attractive faces (right) show less fluctuating asymmetry than unattractive faces (left). The picture in the middle is the average (from [Schaefer et al., 2006])

1992]. Immunocompetence is highly relevant because the steroid reproductive hormones may negatively impact immune function [Folstad & Karter, 1992]. Extreme male features, which are triggered by testosterone, thus advertise honestly that their bearer could afford to suppress his immune system and still resist parasites. Yet females modify their perception of male traits in the course of their menstrual cycle. At the point of highest conception probability (ovulation) the typical male sex-hormone markers are most attractive [Johnston et al., 2001].

Sex hormone markers also play a role for female beauty. The typical female fat distribution (i. e. breasts and buttocks) and for instance lip height are developed under the influence of estrogen. But it is not only the size of sex hormone markers – it is also their shape which affects attractiveness

ratings – males, for instance, find female breasts with a V-shaped breast axis attractive [Grammer et al., 2001]. Female fat distribution also might signal a stable hormonal state, because fat cells can hold estrogen and thus stabilize the female cycle.

The general blueprint for the development of sex hormone markers is developed very early in life. The hormonal environment during the first six weeks of gestation made up of the sex hormones estrogen and testosterone is responsible for the adult masculinity of femininity in appearance [Fink et al., 2005].

### The eight pillars of beauty

In general human attractiveness seems to signal genetic fitness and health [Grammer et al., 2005]. Besides sex hormone markers we find

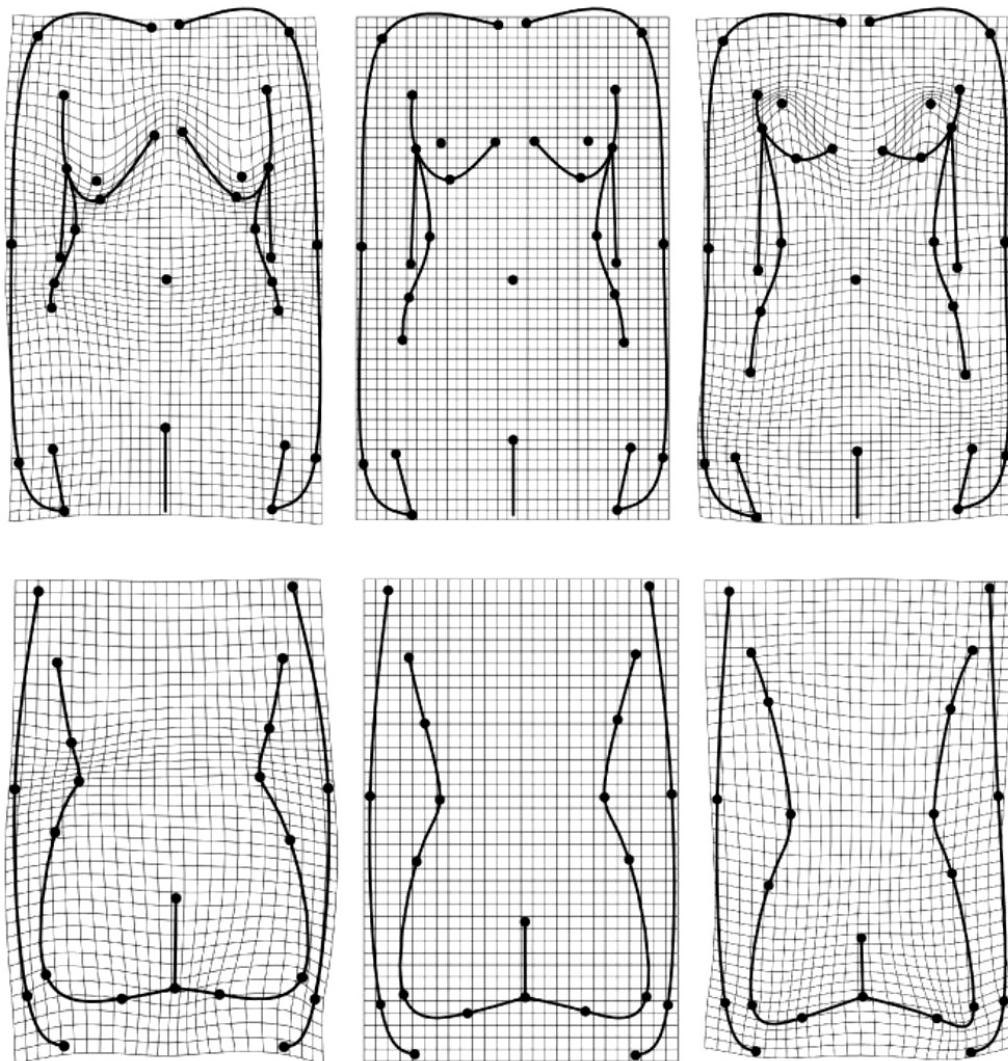


Fig. 3. Attractive front and back views (right) show less fluctuating asymmetry and determined sex hormone markers than unattractive views (left). The picture in the middle is the average for either front or back view (from [Schaefer et al., 2006])



more aspects of a construction set for beauty templates. Youthfulness seems to be paramount and signal reproductive potential [Grammer et al., 2003]. One sign for youth is the absence of body hair or the presence of a baby-face – both traits contributing to high attractiveness ratings. Males also show a preference for blonde hair – actually this also seems to be a sign of youth, since during ontogeny human hair darkens with age [Grammer et al., 2001].

Besides youth we find that fluctuating asymmetry i.e. randomly occurring asymmetries in the body and face are perceived as unattractive [Grammer & Thornhill, 1994]. The absence of asymmetries could signal developmental stability. This means that missing asymmetry might be a sign that the organism was able to deal with environmental perturbations during development. Symmetry also affects voice quality: Attractive voices come from symmetrical bodies (Hughes et al., 2002). Thus symmetry may be an honest signal for mate quality.

Symmetry has been shown to be an important mate selection criterion in many species, from scorpion flies [Thornhill, 1992] over birds [Møller, 1992] to humans.

The relation between attractiveness and most body measurements is not linear – and most of the traits are perceived as most attractive when of average size. Generally averageness seems to make not only faces more beautiful, but also bodies. Humans tend to avoid extremes and this also accounts for attractiveness [Grammer & Thornhill, 1994], so humans prefer for instance average breast sizes in females and average waist to hip ratios.

Another pillar of beauty is body odor. Humans have a genetically determined individual signature in their body odor [Penn et al., 2006] that conveys information about the immune system. If parasite resistance is a necessary trait, the immune system could advertise its ability to cope with parasites via body odor. Indeed symmetrical females with

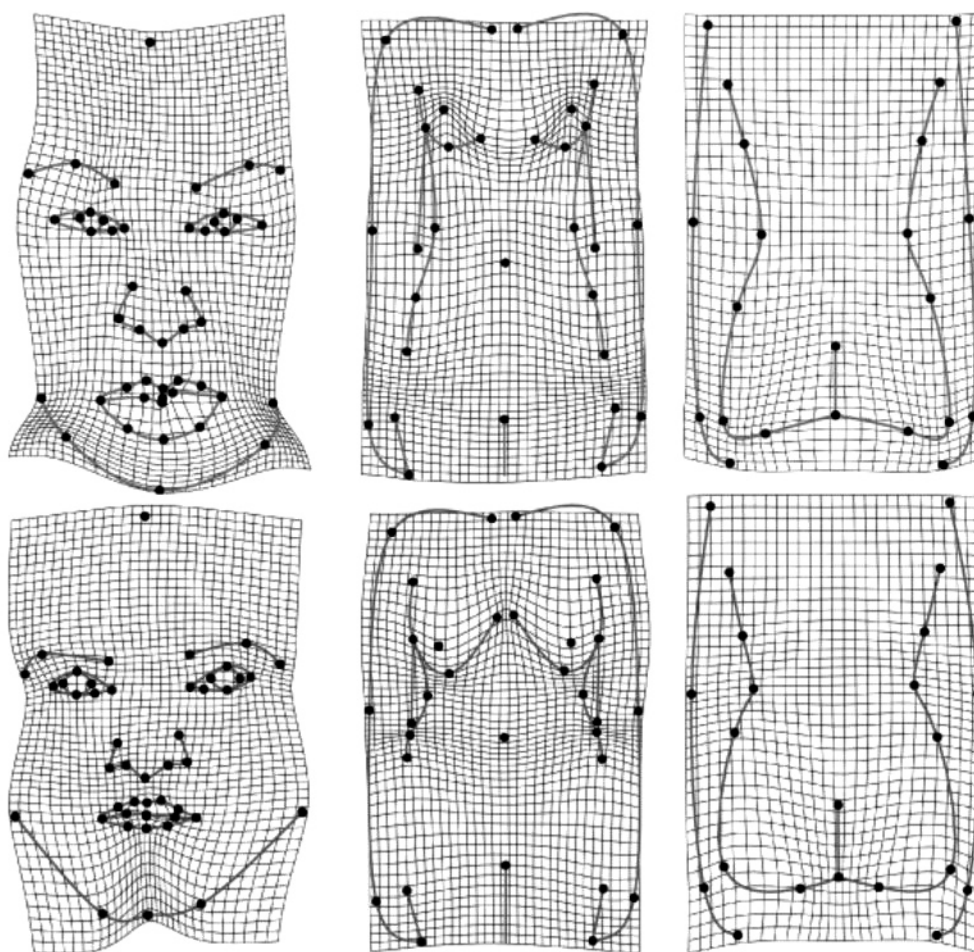


Fig. 4. Simultaneous regression of the whole body in different views reveals that the whole body is one single ornament (attractive upper row) (from [Schaefer et al., 2006])

attractive faces also smell pleasant for males [Rikowski & Grammer, 1999]. As it is the case of sex hormone markers females modulate their preferences depending on the perception likelihood during the cycle – good-looking symmetrical males smell pleasant for females only during mid-cycle.

An almost completely neglected pillar of beauty is the appearance of skin texture. With the help of computer based image analysis of skin texture we showed that homogenous textures are more attractive and signal youth [Fink et al., 2006, Marts et al., 2007]. In addition skin texture homogeneity and attractiveness are related to a variable and parasite resistant immune system [Roberts et al., 2005].

As for skin texture, information about beautiful hair is abundant. We know that long and shiny hair is attractive [Grammer et al., 2001] and we can speculate that long hair is extremely difficult to produce and its shininess could signal parasite resistance and thus genetic fitness.

The last pillar is body motion. We know that body motion is attractive when it is sex specific [Grammer et al., 2003], and that attractive dance movements are made by highly symmetrical individuals [Brown et al., 2005].

All these different signals contribute to the perceived attractiveness of a person – but how do the traits interact? We assume that the human body is one ornament and that the attractiveness of respective traits is correlated. Indeed women with beautiful faces also have beautiful bodies [Thornhill & Grammer, 1999]. And from the results presented above, we also know that symmetry is related to most features, like body odor, voice attractiveness and facial or bodily attractiveness. Thus we can conclude that the pillars of beauty are interrelated and form an ornament – this ornament signals genetic fitness.

But there are several caveats for an approach like this: “attractiveness” has to be a flexible concept. The reason for this is that a fixed template for attractiveness could unnecessarily narrow down the possibilities in mate selection. This leads to another question: Why do we not become more and more attractive and beautiful by sexual selection? This notion gives rise to an argument already presented here. Van Valen (1973) called the argument the “Red-Queen-Hypothesis”. It is based on an experience Alice made in Lewis Carroll’s novel “Alice behind the mirrors”. Alice proposes to race

against the red queen on the chessboard in order to become queen herself. Unfortunately one of the principles behind the mirrors is that you have to be twice as fast as you can in order to move at all. The host-parasite co-evolution can be considered such a race. In this view only genetic variability can help and promote a certain time deferment in the race against an unpredictably changing environment. Thus we are able to go in our argumentation much beyond Darwin - attractiveness is a construction set of signal templates, which can be empirically assessed.

### Alternative views: Neuroaesthetics

Several studies have shown repeatedly [Galton, 1879; Kalkofen, Müller & Strack, 1990; Langlois & Roggman, 1990; Müller, 1993, Grammer & Thornhill, 1994; Perrett, May & Yoshikawa, 1994] that computer generated prototypical faces are more attractive than the single faces which have been used for generating them. But there are two caveats: This is only replicable for female faces and all researchers find that there are some individual faces, which are more attractive than the prototypes.

If our brain uses prototypes, the aesthetic preference for averageness in human faces could well be coupled to being “prototypical”. Thus there might be a better fit of the stimulus onto the prototypical template. As a result, prototypes are recognized faster and better and thus might create higher nervous excitation. This fact could be the reason for the preference of averageness. Our brain could accept more willingly those stimuli, which fit to its construction, thus making the processing less demanding. Müller (1993) named this process “neuroaesthetics”. This approach is carried further by Enquist and Arak (1994). They propose that any notion of beauty or aesthetics is not bound to any biological function, in the sense that such preferences are related to reproductive success. In contrast they see aesthetic preferences as a result of the general construction of the perceptive and cognitive apparatus that has to follow certain construction rules. But generally such an approach only moves the argumentation on a different level – even if beauty preferences themselves are an inherent result of our sensory and cognitive apparatus, this does not exclude any relation to the evolutionary principles of promotion of reproductive success and positive

emotional feelings towards such stimuli. In this sense, we could argue that there is a co-evolution of evolutionary aesthetic principles and our perceptive and cognitive apparatus.

### **The future of the adapted mind**

One feature of the adapted mind – which is rarely addressed – is the fact that any adaptation is prone to exploitation and – this may be even more dangerous – can be exploited by cultural developments. This means not at all that we are ill- or mal-adapted to modern environments. It may be simply the case that new cultural developments can outrun biological adaptations. One example is the speed of information transfer. Many of our adaptations are possibly bound to slow and small information changes in our environment, while the invention of modern media techniques has created a completely new situation. Literature shows that beauty is a toll to acquire status and success and – naturally unconsciously – reproductive success. If this is true, artificial body enhancement that amplifies attractive features will be widespread. As almost all cultures use some measures to modify the appearance, this is no new development. But of course, modern techniques in aesthetic surgery make more severe changes of the body possible. Yet beauty is limited - by evolution we cannot become more beautiful, since a high genetic variance is necessary for biological success. Furthermore, if a certain beauty enhancement generates status, this enhancement will lose its advantage when employed by too many people, and new manipulations have to be introduced. This is the eternal circle of new fashion and beauty product inventions. But how can this process be linked to prototyping? If beauty standards are a result of what people perceive in the mass media, exposure to media will change the prototypes. As the media themselves will use beauty for the status quest among different types of media, beauty standards will automatically trickle down in the media and then a quest for more beauty will start. As human beauty is limited (see above) it is plastic surgery and hormonal treatments that come into play.

Aesthetic surgery, especially breast augmentation plays an increasing role. Surveys suggest that more than 800.000 American women have breast implants. The majority of these surgeries were carried out without medical reasons. Surveys suggest that the average woman desiring surgical

breast augmentation is as psychologically stable as other women. They differ from other women only in limited areas - primarily in her negative evaluation of her breasts and her greater emphasis on dress and physical attractiveness [Shiple, O'Donnell & Bader, 1977]. Increase of attractiveness is the reason for plastic surgery. Indeed, in very young girls who have a breast surgery the removal of any types of asymmetries is the reason for more than 60% of the cases [Grolleau, Pienkowski & Chavoïn, 1997]. This correction would be expected if we take the role of symmetry in beauty detection into account. In a study of differences between women who had received augmentation mammoplasty and women who had not, interesting differences occurred [Cook et al., 1997]. Women with breast implants were more likely to drink a greater average number of alcoholic drinks, be younger at first pregnancy, be younger at first birth, have a history of terminated pregnancies, have used hair dyes, and have had a greater lifetime number of sexual partners than women without. These differences between women with and without breast implants suggest that breast augmentation may lead to higher attractiveness for males, higher amount for possible choices of high status males, and finally a possible higher reproductive success. But as soon as this circle is started and success is triggered by surgery, its use will spread and lead to more and more surgery, until the plastic people emerge.

This is the dark side of this game. Men who see movies with beautiful women adjust their beauty standards accordingly [Kenrick & Gutierrez, 1980; Kenrick, Gutierrez & Goldberg, 1989]. They then have higher aspiration to attractiveness in a dating experiment. Media thus can create “unreal” beauty standards. When the media raise attractiveness standards by prototyping beauty then unreal expectations to mate quality (beauty) will emerge. If the prototype is far more beautiful than what exists in reality no mate-selection can occur on realistic grounds. The consequence would be an increasing number of singles.

The second, even more problematic development is coupled to the emergence of relatively new diseases like anorexia and related other diseases. Feminists blame social pressure for women's dissatisfaction with their bodies. In trying to achieve the slender, toned body that is associated with youth, women – and recently also men – even run the risk of developing eating disorders. But



actually, this social pressure is caused by other women who compete for the same resources, and not by the beauty industry. It is a trickle down phenomenon with a biological basis that turned with the help of fast information spread into the beauty-rat race. One can only speculate where these recent developments may lead. One of the possible outcomes could be an artificial world populated by artificial people. On the other hand, the almost unlimited possibilities to manipulate ones' appearance could also lead to a new search for honest signals, thus maybe even creating a new trend for naturalness. Maybe we will evolve to regard properties as valuable signals of beauty which do not play the slightest role today? Time will show!

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### ПРОБЛЕМА ДАРВИНА: ЭВОЛЮЦИОННАЯ ЭСТЕТИКА И ЧУВСТВО ПРЕКРАСНОГО

Люди склонны судить о своем окружении, как социальном, так и несоциальном, в базовых категориях «нравится» и «не нравится». Эти сформированные предпочтения об окружении могут быть обозначены термином «эволюционная эстетика».

Люди и животные вырабатывают предпочтения касательно лиц противоположного пола, еды, привычек, запахов и вещей. Они начинают формироваться в раннем возрасте. Например, трехмесячные дети дольше разглядывают привлекательные, чем непривлекательные лица. Это позволило Ланглуа, Рогману и Райзер-Дэннеру (1990) заключить, что стандарты красоты не результат научения, а некий врожденный детектор красоты. Привлекательных детей меньше наказывают, привлекательные студенты получают более высокие оценки, привлекательность может стать решающим фактором при найме на работу и даже способствовать более мягкому наказанию в случае судебного разбирательства.

Более того, мы уверены в том, что привлекательные люди лучше: «что красиво, то и хорошо» – это общее правило нашего мышления согласно Диону и др. (1972).

Все это приводит к вопросу: откуда происходит эта навязчивая увлеченность красотой и привлекательностью? Мы покажем, что критерии полового отбора человека, которые были выработаны в течение эволюционной истории человечества, ответственны за формирование нашего восприятия привлекательности и красоты.

#### Проблема Дарвина

Эта идея была выдвинута Дарвином, его же работы и предопределили любые теоретические разработки в этом направлении. Дарвин доказывал, что основные эстетические элементы человеческого восприятия являются результатом полового отбора. Факты, которыми располагал Дарвин, убеждали его в том, что существует огромное разнообразие во внешнем облике людей, и до сих пор некоторые исследователи полагают, что стандарты красоты культурно детерминированы.

Но несмотря на то, что стандарты красоты могут различаться между культурами и между эпохами, в этой статье мы покажем, что лежащие в их основе ограничения, которые и определяют эти стандарты, являются одними и теми же, и что эти ограничения могут иметь эволюционное происхождение.

Неспособность Дарвина объяснить основания эстетических предпочтений была решена современными эволюционными теориями. Теоретические основы, позволяющие объяснить наши эстетические предпочтения, заложил в 60-х гг. XX в. Конрад Лоренц. Первая идея связана с тем фактом, что наше мышление является результатом эволюции и, следовательно, наши когнитивные структуры – это механизмы адаптации, призванные разрешать проблемы, возникающие в прошлом. Во-вторых, Лоренц доказывал, что в процессе эволюции определенные средовые стимулы, способствующие репродуктивному успеху, были



связаны с позитивными эмоциональными реакциями [Лоренц, 1973]. Эта идея привлекла большое внимание в научной дисциплине, названной «эволюционная психология».

### **Эволюционные ограничения эстетического восприятия**

Если механизмы адаптации к восприятию красоты существуют в форме специализированных модулей сознания [Космидес и Туби, 1992], они должны были формироваться эволюционными ограничениями, связанными с репродуктивным успехом. Коэволюция хозяйина и паразита [Гамильтон и Зак, 1982] предсказывает, что устойчивость к паразитам (parasite resistance) должна быть ценной чертой в выборе полового партнера. Но развитие сигнальной системы о пригодности организма к производству потомства (что связано с устойчивостью к паразитам) сталкивается с одной проблемой: возможность обмана. Особи могут пользоваться наличием сигналов привлекательности, не обладая при этом лежащими в их основе качествами, т. е. пригодностью к производству потомства. Таким образом, ценность подобных сигналов может быть потеряна. Следствием этого стала эволюция подлинных сигналов («честных сигналов»), которые могут быть выработаны только в определенных условиях. Захави и Захави (1997) предположили, что подлинность сигналов может инициироваться недостатками (дефектами). Это означает, что само по себе воспроизводство сигнала дается дорогой ценой и говорит о возможных дефектах своего носителя.

Например, привлекательные широкие челюсти мужчин могут сигнализировать о недостатках в иммунной системе. Это единственная черта лица мужчины, которая была положительно связана с привлекательностью в нескольких проведенных исследованиях. Для формирования этого признака требуется высокий уровень тестостерона, который подавляет функционирование иммунной системы и, следовательно, увеличивает восприимчивость к болезням в период полового созревания. Таким образом, преувеличенно мужские черты, пусковым механизмом которых является тестостерон, честно сообщают о том, что их носитель может подавлять свою иммунную систему, но, тем не менее, устойчив к парази-

там. Восприятие женщинами мужских черт меняется в течение менструального цикла. В точке наибольшей вероятности зачатия (овуляции) типичные маркеры мужских половых гормонов наиболее привлекательны [Джонстон и др., 2001].

Маркеры половых гормонов также играют роль в женской привлекательности. Типично женское распределение жира (молочные железы и ягодицы), а также, например, высота губ формируются под влиянием эстрогена.

### **Восемь столпов красоты**

Человеческая привлекательность, вероятно, сигнализирует о генетической приспособленности и здоровье. Помимо маркеров половых гормонов, мы также обнаружили и другие факторы, связанные с конструированием шаблонов красоты. По-видимому, молодость является главным из них и свидетельствует о репродуктивном потенциале. Одним из признаков молодости является отсутствие волос на теле или детское лицо (обе черты оцениваются как очень привлекательные). Мужчины также предпочитают белокурые волосы – это также признак молодости, поскольку с возрастом наши волосы темнеют.

Флуктуационная асимметрия, т. е. случайная асимметрия тела и лица, воспринимается как непривлекательная. Отсутствие асимметрий может свидетельствовать об устойчивости индивидуального развития. Человек с симметричным телом также обладает привлекательным голосом. Итак, симметрия – подлинный сигнал качества полового партнера.

Наиболее привлекательными воспринимаются черты средних размеров. Люди избегают крайностей.

Ещё одним столпом красоты является запах тела, который несет информацию о состоянии иммунной системы. Если устойчивость к паразитам является необходимой чертой, то иммунная система может сообщать о своей способности справиться с паразитами посредством запаха тела. Симметричные женщины с привлекательными лицами также обладают приятным для мужчин запахом. Симметричные мужчины привлекают своим запахом женщин только в середине менструального цикла.

Текстура кожи – основание красоты, практически полностью игнорируемое ранее.

Мы показали, что однородные текстуры кожи более привлекательны и свидетельствует о молодости.

Много информации о красивых волосах. Длинные и блестящие волосы привлекательны, и мы можем предположить, что крайне трудно «вырастить» длинные волосы, а их блеск может говорить об устойчивости к паразитам.

Последним столпом являются телодвижения. Мы знаем, что движения тела привлекательны тогда, когда они обладают половой специфичностью. Привлекательные танцевальные движения делают люди с высокой симметрией тела.

Можно предположить, что все эти сигналы взаимодействуют, образуя сложный орнамент, свидетельствующий о генетической пригодности.

Почему же посредством полового отбора мы не становимся все более и более привлекательными? Возможно, дело в том, что в непредсказуемо изменяющейся окружающей среде может помочь только генетическое разнообразие.

#### **Альтернативные взгляды: нейроэстетика**

В исследованиях было неоднократно показано, что созданные при помощи компьютера прототипические лица более привлекательны, нежели лица, при помощи которых они были созданы. Нужно сделать две оговорки: это верно только для женских лиц и все исследователи отмечали, что отдельные лица, которые привлекательнее прототипов.

Если наш мозг использует прототипы, то эстетическое предпочтение «срединности» (averageness) в человеческих лицах можно связать с их «прототипичностью». Но даже если предпочтения в красоте являются неотъемлемым результатом деятельности наших сенсорных и когнитивных органов, это не исключает их связи с эволюционными принципами содействия репродуктивному успеху и позитивных эмоций к подобным стимулам. Можно попытаться доказать, что происходила коэво-

люция эстетических принципов и наших когнитивных и перцептивных органов.

#### **Будущее адаптированного ума**

Адаптационные механизмы может использовать в своих интересах культура. Это вовсе не означает, что мы плохо приспособлены к современной среде. Это может просто означать, что новые культурные явления могут опережать биологические адаптационные механизмы. Одним из примеров является скорость передачи информации.

Красота является средством получения статуса, успеха и – естественно бессознательно – репродуктивного успеха. Если это так, искусственное улучшение тела, которое усиливает привлекательность, получит широкое распространение. Современные технологии (пластическая хирургия и гормональная терапия) позволяют производить в теле серьезные изменения. Так, более 800 тыс. американских женщин имеют грудные имплантаты. Увеличение груди может вести к большей привлекательности для мужчин и способствовать репродуктивному успеху. Использование хирургии будет расти, что, возможно, приведет к появлению «пластических» людей. У этого есть и темные стороны.

Мужчины, которые смотрят фильмы с красивыми женщинами, соответственно меняют свои стандарты красоты. СМИ создают «нереальные» стандарты красоты, которые приводят к завышенным ожиданиям относительно качества (красоты) полового партнера. Следствием этого будет рост количества одиночек (неженатых мужчин и женщин).

Вторым следствием, даже более проблематичным, является появление относительно новых расстройств (например, анорексии).

К чему все это приведет? Может, к искусственному миру, в котором живут искусственные люди. Может, к новому поиску подлинных сигналов. Время покажет!

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