DARWINIAN AESTHETICS OF FEMALE FACE

Adaptive account of averageness, neoteny, hormone markers and hairstyles in the estimate of phenotipic quality of female face

Ph.D. theses

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Table of Contents

1. Theoretical background

The widespread view in the social sciences that physical beauty is arbitrary has been seriously questioned recently by evolutionary psychology (Gangestad and Simpson 2000). Human beings have been selected to be able to evaluate cues associated with the reproductive value of a potential mate (Buss and Schmitt 1993; Langlois et al. 2000; Symons 1979). For females, age has a relatively invariant association with fertility and thus with their mate value. Since their fecundity sharply declines with age, body traits indicating their youth are preferred by males (Bereczkei et al. 1997; Buunk et al. 2001; Kenrick and Keefe 1992). A youthful or neotenous face is characterized by certain facial proportions, especially a thinner jaw, small nose, large eyes, and large, full lips. Raters found feminized female faces the most attractive, whereas masculinization – enlarged jaw, lateral growth of cheekbones, and lengthening of lower facial bones – decreased attractiveness (Johnston et al. 2001; Perrett et al. 1994, 1998).

Several studies of various populations have revealed that male raters find faces that appear younger than their actual age to be more attractive (Cunningham et al. 1995; Jones 1995). According to the sensory bias theory of sexual selection, neoteny is a supernormal cue of youth. During evolution individual females whose faces exhibit exaggerated cues of youth have an advantage in female-female competition for desirable mates (Jones 1996). Men's preference for facial markers of high, age-related fecundity was a sensory bias that selected for neoteny in female faces (Miller 1998). Other researchers suggest that attractive facial traits are not so much exaggerated cues of age as indicators of actual phenotypic and genetic quality (Fink and Penton-Voak 2002; Thornhill and Gangestad 1993, 1999). These features – high cheekbones, full lips, small chin – are onsidered to be hormone markers that show a relatively high ratio of estrogen to testosterone. Although a high level of estrogen is associated with fertility, it could also imply harmful effects given that estrogen can draw resources away from other bodily functions (e.g., immune system, repair mechanisms), and its byproducts are toxic. Therefore, estrogen markers on the face may reliably signal that a female's immune system is so highquality that it can deal with the detrimental effects of high estrogen

levels (Gangestad 2000; Grammer and Thornhill 1994; Thornhill and Grammer 1999). According to the Zahavi principle, only people with good genes are able to pay the costs of displaying such traits. Female facial attractiveness thus advertises the high immunocompetence of the bearer, and it evolved because of male preference for healthy and fertile mates. Indeed, several recent studies have revealed that the most attractive female faces have extreme secondary sex traits, and their bearers' health condition is above average (Hume and Montgomerie 2001; Kalick et al. 1998; Shackelford and Larsen 1999).

Although facial traits that are judged beautiful across cultures have been investigated using a framework of sexual selection theory, the effects of head hair on our esthetic evaluations have rarely been examined from an evolutionary perspective. Yet, hair plays a significant role in our mate choice (Kingsley 1995). One of the first characteristics we notice upon meeting another person is their hair. In an experiment in which the same women were portrayed either as blondes or as brunettes, blondes were rated as more attractive, feminine, emotional, and pleasure seeking, whereas brunettes were seen as more intelligent (Cunningham et al. 1997). The authors suggest that blondness serves as a cue to neoteny. Another study has revealed that younger women tend to wear their hair longer than older women, and that hair quality was correlated with women's health (Hinsz et al. 2001). Grammer and colleagues (2001) found that males prefer long hair in women and speculated that longer hair may provide a larger surface for the distribution of sexual pheromones produced in the apocrine glands. Several studies found that males with scalp hair were rated as more handsome, strong, active, and sharp than those who were balding. Baldness among males led to decreased perceptions of socially desirable traits, including attractiveness and assertiveness (Muscarella and Cunningham 1996). At the same time, a receding hairline may convey a message of maturity and social dominance, and baldness is consistently associated with an increased perception of age and intelligence.

2. New Findings

5. Attractiveness of the female faces is derive from variant intensity of characteristics of their parts (mouth, forehead, chin, nose, etc.). In the process wherein the male perciever adjudge beauty of a female face, these parts (facial features) set a peculiar design.

6. Facial proportion of synthetic average female face (generated in computer) is more attractive even if it's parts are changed.

7. Long and medium-length hair had a significant positive effect on ratings of women's attractiveness. These two hairstyles caused a much larger change in the dimension of health than in the rest of the dimensions. Male raters considered the longer-haired female subjects' health status better, especially if the subjects were less attractive women.

8. The way as young women wear their hairdos is impregnate the evaluating of their own phentotipic quality. Effect of this, less attractive women are more susceptible for the males' preferences. This women shape their hairstyles in correspondence with the males preferences and develop their hair longer than more attractive women.

3. Research

3.1. ATTRACTIVENESS OF THE FEMALE FACE: HIERARCHY OF PERCEPTUAL FILTERS

This research was aimed at answering the quetion wether men percieving female faces recieve information communicated by facial features in a holistic way as a gestalt, or certain features are more likely to account for attractivity than others in making such a decision. In further analysis we tried to find out, to which measure facial features in our study (phentotipic markers) are predicitive in judging attractivity, and in which order they gain importance in evaluating the physical appearance of others.

Our participants consisted of 74 female students, whose faces were photographed in a standard way. These photographs were judged by male students on a 1 to 6 scale considering attractivity. Predictor variables were gained by measuring facial features of women on the photographs, followed by a stepwise regression analysis of attractiveness scores. Wheter different facial features predict beauty of the face together (i.e. there is no difference in priority), or certain features precede others and predict attractivity in a discriminative manner. Our results show there is an unanimous ranking of different facial territories, which supports the hypothesis, that percieving beauty can occur through perceptual filters. i.e. certain features are more likely to account for attractivity than others. This finding suuports the idea of different phenotypical keys refering to different qualities of energy consumption.

So our results support the theory of Multiple Fittness Theory (Cunningham et al. 1990, 1995, 1997, 2002, Cunningham and Shamblen 2003), according to which not every facial feature (and physical trait) is universally attractive. Features refer to phenotypical quality in different ways, because they show different forms of evolutionary fitness. In this sense feature complexes considered as attractive (juvenility, sexual maturity, friendlyness etc.) become attractive in a unique combination. Participating in another combination propagating different qualities they become attractive in different ways (perhaps for a different observer). That's why in explaining our results it was less important (as for now) what

was the ranking of different facial regions. It was rather important that there is a measurable difference in effect.

2.2. EFFECT OF AVERAGENESS ON DARWINIAN AESTETHICS OF FEMALE FACE

One important marker of facial beauty is averageness which is not analogue with ordinary, but refers to a mathematical average, which summerises features of several unique faces (Langlois and Roggman 1990, Langlois et al. 1991, 1994). In this sense average faces computed by átlagolási eljárás are considered as some kind of population average. According to Thornhill and Gangestad (1993) preference of átlagosság has evolved, because through certain heritable features átlagosság is connected to heterozygocy. Heterozygocy is a marker of genetic variability, which in turn plays an important role in resistancy against parasites. Numerous research confirm the attractiveness of the average face, although the case is not that simple, because according to several studies features different from average can improve the judgement of a face (Alley and Cunningham 1991). Nonetheless, averageness and attractiveness seem to be connected in such a strong manner, that recent contributions reveal this preference in the case of different living and inanimate objects (Halberstadt and Rhodes 2000, 2003). So preference for average face seems to be part of a universal cognitive mechanism, prototype formation, which is an inherent part of human cognition (Rosch 1978).

Modifying parts of an average female face (made out of 8 unique faces) in our second research, we were interested in how judgement of beauty can be influence by systematical alteration of certain facial features. Six features (eyes, mouth, nose, forehead, chin and jaw) were modified in 8 different measures (increased or decreased by 5-10-15-20 percent) and these modified pictures were shown men, who judged percieved attractivity. Results show preference for near average regions. No different choices were found in different features, averaged facial parts seemed to be most attractive in each case, and no discriminative results showed up for 5 percent changes. Judges seem not to have percieved these differences. Changes in facial features bigger than this had an exponential effect, i.e. the bigger the change the less attractive the face was found. In a different setting with these pictures, our results seem to be more differentiated. Using forced choice task method participants only had to choose the most and

and least attractive of the pictures. Results show men to be sensitive to changes in size of the female chin.

Results of former study contradict our hypotheses, but underline the effect of átlagosság and confirm Single Features Approach (Thornhill és Grammer 1999), as far as variations in average face can not modify attractivity optionally, because this would be an artificial change in a certain feature-complex. On the other hand according to our second study, faces with smaller chin were found more attractive. This result is in accordance with the results of Pettijohn and Tesser (1999), who suggest demand for signals of the maturity of female faces to be bigger in a decreasing economic situation. In their study several demographic and economic data were collected, such as changes in prices and income. These were compared with the face proportion data of the 81 most popular american actress of the same period (1932-1995). When economy stagnated, preference was higher for mature, square features such as bigger chin in these ideal, iconic female faces. In our method no such data were included, but we assume, that our results verifies the ecological validity of judging beauty as in Miltiple Fitness Theory (Cunningham et al. 2002).

3.3. HAIRSTYLES AS AN ADAPTIVE MEANS OF DISPLAYING PHENOTYPIC QUALITY

Although not a much investigated topic, there are several shared opinions on the role of hairstyles in judging attractivity. Grammer (et al. 2002, pp. 95.) "The general function of hair (on the head, in the armpits and pubic hair) may be the distribution of pheromones produced in the apocrine lands. Hair is expected to give a greater surface for pheromone distribution into he air. Thus, long female hair may be a «pheromone distribution organ» correlated with optimal female sex hormone levels. The scalp (and all other regions of the human body that are covered with hair) has apocrine glands, which are thought to be responsible for pheromone production". That is why Grammer et al. suggest men to prefer long hair in women, which is more stable, because androgen hormones facilitate getting bold in mature men. The universal idea of ornamentics being relevant to every single feature is easily recognisable in this view. Hinsz (2001) found in a study with more than 200 participants (aged 13 to 73), that younger women wear significantly longer hair than older women, and longer hair is strongly connected to health state. Cunningham (et al. 2002) suggests that length of hair

hair in this sense informs women of their socio-sexual status, because younger women wearing longer hair have higher reproductive potential. Besides, hairstyle as well as other grooming-activities (tattoos, clothing, jewelery) can indicate group belonging and status.

Our third research was amined at the effect of different hairstyles on biologically given features of female face. In order to do that, female portraits (with bearly recognizable were standardized by male judges concerning atrractiveness, and these portraits were completed with six different hairstyles () using a computer program.These stimuli had to be judged by male judges in four dimensions of attractivity (juvenility, femininity, sex-appeal, health) using scales. Analysing the data we compared reactions to the most and least attractive faces. This analysis showed that only long and semi-long hair increased significantly the judgement of female beauty, other hairstyles has no effect on physical attractivity. These two hairstylse had the strongest effect on the health dimension as well. Men judged health status of women with longer hair as better, especially in the case of less attractive women. In our opoint of view, longer hair can increase attractivity of the face, because according to "good genes" model it can signal physical status, because growing such a long hair is very expensive and energy consuming (Dawber et al. 1998, Ebling 1986). Further, hair is very sensitive to the changes in homeostasis of the organism: bright, clean and long hair is a reliable marker of physical quality. Hair is very expensive in its metabolism and to rendben tart, what can account for individual differences. According to Zahavi principle (Zahavi 1975, Zahavi and Zahavi 1997) only a small proportion of the population with outstanding genetic quality can afford to grow healthy, long hair.

Our results can be expained in the framework of Multiple Fitness Theory (Grammer et al. 2002), as far as phenotypic fitness communicated by long hair differs from genetic and phenotypic quality signaled by facial beauty. We suggest that beauty of face and hair are connected to different qualities of energy houshold. Although hair (as well as skin and nails) is sensitive to sudden hormonal changes (e.g. in adolescence, during pregnancy and breast-feeding), but is not directly effected by sex hormones. E.g. take the long hair of men, which is common in several cultures (e.g. apache indians, ethnical gypsies). In this sense our results do not confirm redundant signal hypothesis (Grammer et al. 2002).

2.4. FEMALE HAIRSTYLE AS PART OF AN ALTERNATIVE MATECHOICE TACTIC RELATED TO BEAUTY

Our fourth research was aimed at the effect of women's attitude and hairstyling habits on their matechoice strategies. The *theory of alternative matechoice strategies* (Gross 1996, Waynforth 1998, 1999, 2000) described the following in male intrasexual competition. Individuals with poor genetic quality (physically less attractive, higher asimmetry) use alternative matechoice strategies, which are important for reproductivity in a different way. Males with higher willingness to parental investment increase their adaptive fitness using an alternative behavior, with which they try to compensate for poorer genetic quality.

Presumably similar selectional pressure connected to intrasexual competition can work among women with different phenotypic qualities, which results in different individual strategies in order to increase their genetic succes. We hypothetise less attractive women to compensate their unbecoming biological traits of their faces (maturity instead of neoteny, masculine facial regions instead of oestrogen markers) with other features, such as long and healthy hair, which improves the judgment of facial attractivity, and with styling attitude favoured by men, which can increase succes in matechoice.

Testing our hypothesis we made portraits of volunteer women, and let their beuaty be judged by men on a scale of seven. The portraits were completed by 15 different hairstyles using a computer program, and (female and male) participants were asked to rank the portraits from best to least suiting hairstyles. So, two strings of data were obtained conserning each woman: (1) their own opinion on their faces with different hairstyles, (2) the averaged opinion of men on the same faces. Analysing the two hierarchy ranking, we found out whose decision is in accordance with preferences of men, and who form their opinion on their physical appearance independent from male preferences. Besides, female participants were administered a questionnaire, where data concerning hairstyling, matechoice and measures hair lenght (in cm) were obtained. Our results confirm our predictions and underline both the theory of alternative matechoice strategies and theory of life-history strategies.

We suggest that female hairstyling is embedded in the broader context of own phenotypical condition (communicated by the face). After evaluating biologically given markers of beauty, individuals use alternative strategies, which can help them maximize their matechoice succes. Hair and hairstyling attitudes altering attractivity of the face can be a means of it. Less attractive women seem to be more sensitive to be judged by males, so their form their opinioins in accordence with male preferences. They wear longer hair, what enables them to style their hair in many ways, accomodating to men's demand on variety. These tactics help them spend less time alone between two relationships. They possibly try to maximize their matechoice succes with short-term relationships. Women increasing the number of partners can gain genetic benefit in reproduction through a multidimensional mechanism. Women judged more attractive based on their faces – with better genetic qualities – can afford to make decisions concerning their appearance independent of male preferences, because favourable phenotypic features direct men's choices to them anyway. So variety in female attitudes toward hairstyling can be conceptualized as part of women's intrasexual competition in reaching partners with better qualities (Jennions and Petrie 2000).

This is vital because in contrast with the animal kingdom – where usually females choose, because they show higher parental investment, while males rarely participate in rearing an offspring other than mating - in our species women can be chosen, and men make important paternal investments in rearing an offspring. According to several authors the evolutionary importance of women's physical attractiveness in matechoice evolved paralel to the wide spread of paternal investments.

The studies in this dissertation are pioneering in the history of domestic scientific research, suggesting further investigation. In its topics and methods this dissertation is fully in agreement with international "face-workshops", but studying the female hairstyle is a unique contribution and can be the characteristic of the evoltutionary workshop in Pécs.

Scientific results

PUBLICATION

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