

**Hair length, facial attractiveness, personality attribution; A multiple fitness
model of hairdressing**

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Running title: Hairstyles, facial attractiveness, evolved mate preferences

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Abstract

The Multiple Fitness Model states that attractiveness varies across multiple dimensions, with each feature representing a different aspect of mate value. The present study shows that the physical appearance of long-haired women was rated high, regardless, of whether their facial attractiveness was valued high or low. Raters judged those women as the most attractive whose face displayed neonatenous features in the center of the face (large eyes, small nose) and sexual maturity features, such as long head hair at the periphery. Furthermore, desirable psychological and social traits were attributed to individuals with different hairstyles: male raters associated long hair with the image of a determined, intelligent, independent, and healthy individual, whereas short hair was associated with characteristic features such as honest, caring, emotional, feminine. The possible relationships between attractiveness ratings on scalp hair and perceived social and psychological traits are discussed.

Keywords: hairdressing, good genes model, multiple fitness theory

1. Introduction

Although facial attractiveness has been intensively studied in various theoretical frameworks of psychology, the effect of head hair on our attractiveness judgments is rarely examined. Yet, hair on the scalp seems to influence individuals' physical appearance, beauty, and mate value deeply. Even children value and praise long hair and attribute positive features to it, such as vitality, power, and cheerfulness. A recent study has revealed that long-haired girls in primary school are more successful than short-haired girls and boys; they have more friends, are regarded as more popular, and considered as more attractive (Baktay-Korsos 1999). Young adult males also prefer long head hair in women (Cunningham et al. 1995). Using a computer technique for altering hairdressing, Mesko and Bereczkei (2004) found that long and medium-length hairstyles had a significant, positive effect on women's attractiveness, whereas other hairstyles (short, bun) did not significantly influence the values of physical beauty. Additionally, male raters value blondes as more attractive and feminine than other hair colors (Cunningham et al. 2002, Rich and Cash 1993), and blond-hair preference is prevalent among girls from primary school (Baktay-Korsos 1999).

Several evolutionary studies have attempted to explain the salience of hair length and hair color in mate choice. Many of these explanations may belong to the Multiple Fitness Model that states that attractiveness varies across multiple dimensions, with each feature representing a different aspect of mate value (Cunningham et al. 1995, 1997, 2002). They distinguished five dimensions (neonate, sexually mature, senescence, expressive, grooming), each related to specific properties of individuals' conditions. Furthermore, each has a considerable effect on discrete perception categories. Several studies have revealed that we attribute positive or negative psychological traits to individuals with different levels of attractiveness. These include social and intellectual competence, dominance and personality traits such as honesty, competitiveness, friendliness, etc. (Paunonen et al. 1999, Rhodes and

Zebrowitz 2002). Since we examine female attractiveness in this study, now we focus primarily on features and dimensions that deeply influence women's attractiveness.

Neonatenous features such as large eyes, high forehead, and small nose convey such desirable qualities as youthful vivaciousness, open-mindedness, honesty, warmth, friendliness, and submissiveness (Paunonen et al. 1999, Zebrowitz 1997). These babyish features are linked to judgments of youth and cuteness, and thus may display a healthy reproductive future, and also may elicit nurturance, care-taking, and resource investment from males. Neotenous features on the face are decisive in attractiveness judgments about females; women with a high, even extremely high neonate quality were regarded as the most beautiful (Jones 1995), and babyish characters are preferred across cultures (Cunningham et al. 1995). Not only facial traits but other bodily attributes also contribute the image of baby-face. Cunningham and his colleagues (1997) regarded fair hair as a cue to neoteny; assuming that it conveys a message of young age. Blondes were rated as more attractive, feminine, emotional, and pleasure seeking, whereas brunettes were seen as more intelligent. Our former results suggested that short hair may play a role in mate choice that is similar to neotenous facial traits, and conveys submissiveness and femininity (Mesko and Bereczkei 2004).

Sexual maturity is conveyed by features that exaggerate the difference between adults and children and between males and females. These features thus emphasize the sexually dimorphic nature of development, and may demonstrate fertility, dominance, social influence and status (Keating et al. 2002, Grammer et. al. 2002). Although investigations clearly show that the connection between maturity signals and social influence is stronger for males than for females (Zebrowitz 1997), several studies reported that male raters valued higher and more pronounced cheekbones highly, and full lips on female faces (Cunningham et al. 1997). Males also prefer long hair and a bun (as a particular style of long hairdressing) to short hair in females, which can be interpreted as a preference for maturity features (Cunningham et al.

1995, Mesko and Bereczkei 2004). Further evidence suggested that sexually mature features were associated with perceived health. In accordance with the above, women's self-rated health was found to correlate with the length and quality of their head hair (Hinsz, Matz, and Patience 2001). In a recent study, long and medium-length hairstyles were shown to improve the male raters' evaluations of the female subjects' health status; they caused larger change in the health ratings than in other attributes of attractiveness (sexiness and youthfulness) (Mesko and Bereczkei 2004).

Senescence features are believed to convey social maturity, a non-threatening form of dominance, and wisdom. In males, graying hair and baldness may be adaptive for the bearers because they induce respect and social maturity. Bald men were judged less attractive as romantic partners but more attractive as mentors (Muscarella and Cunningham 1996). Facial hair signals sexual maturity and dominance, males with beards were perceived as more aggressive, older, and less appealing than those with clean-shaven faces (Muscarella and Cunningham 1996). However, we know relatively little of the relations between senescence type of hair and female attractiveness.

Expressive features that facilitate nonverbal expressions may also contribute to the attractiveness of the face. Large smile, dilated pupil, raised eyebrow, etc. are particularly desirable in females because they may convey excitement, arousal and receptivity, but also friendliness and warmth. Although hair length and styles are not expressive features in the strict sense, they may modify the perception of facial expressiveness. A hair bun was found to enhance femininity, especially among women with less facial attractiveness (Mesko and Bereczkei 2004). Certain particular hairstyles may suggest happiness and kindness, others may convey self-assurance or extravagancy (Morris 1985).

Grooming features, such as makeup and clothing, indicate successful adaptation, group-membership, and status through a selective modification of physical appearance

(Cunningham and Shamblen 2003). Hair can easily be changed in order to increase expressiveness and attractiveness. Haircuts and dying can modify the perceived age and various personality traits associated with facial appearance. Various hairstyles (short, long, knot, dishevelled) deeply influence attractiveness judgments in terms of youth, femininity, and sexual interest. For example, hair worn in a bun increased the perceived age in females, compared to long hair, and increased the perceived femininity, compared to short hair (Mesko and Bereczkei 2004). Full, shiny, well-kept hair may convey health and vitality, whereas dishevelled, unkempt hair is likely to decrease the women's facial attractiveness, especially their perceived health.

2. Hypotheses and predictions

This study aims at investigating several adaptive features of cranial hair that have received little attention previously. Our main interest refers to the differences between facial traits and hairstyles in the respect that they influence physical attractiveness, their interplay in shaping physical appearance, and to personality traits associated with various hair lengths. Our assumptions are organized into three hypotheses and predictions.

Hypothesis 1. Rhodes, Hickford, and Jeffery (2000) state that each facial and bodily signal has a relatively independent effect on attractiveness. They are likely to define different types and directions of attractiveness, although one quality may be more fundamental than others (Zebrowitz and Rhodes 2002). Individuals assess each ornament separately, and combine the different aspects of physical appearance into a "global" impression of mate value. Cranial hair is, therefore, expected to have a specific, separate effect on facial attractiveness. Former studies have shown that compared to short hair, long hair as a signal of better health state is more highly valued in potential females partners (Cunningham et al. 1995, Mesko and Bereczkei 2004). Combining these findings, the following prediction can be made:

Prediction 1. Independent of facial beauty, long and medium-length hair are more likely to increase the women's attractiveness than short hair. In other words, long hair enhances attractiveness, regardless of the proportion of neotenous or maturity characters of female faces displayed without visible head hair.

Hypothesis 2. The Multiple Fitness Model suggests that the most attractive male and female faces contain both highly neonate and highly sexually mature qualities. More specifically, Cunningham et al. (1995, 2002) proposed that an attractive female face has neonatal features in the center of the face (large eyes, small nose) and sexual maturity features at the periphery (prominent cheekbones). Regarding long hair as a signal of sexual maturity (Mesko and Bereczkei 2004), and considering hairdressing as a feature at the periphery of the face, the following prediction can be made:

Prediction 2. Those women are expected to be judged as the most attractive whose large eyes and small chin are combined with long hair. Individuals with less neonatal character and short hair are expected to be rated as the least attractive. All the other qualities are to be placed on a continuum.

Hypothesis 3. Facial appearance and hairstyles are expected to influence attractiveness in different dimensions, and are associated with specific psychological traits. Facial features can directly or indirectly determine the personality characteristics that people attribute to others (Paunonen et al. 1999, Rhodes and Zebrowitz 2002). Research has shown that baby-faced adults are perceived as being relatively submissive, weak, dependent, and honest (Zebrowitz and Montepare 1992). Individuals with pronounced maturity traits are likely to be seen as powerful, influential, competitive. Hair length is also expected to signal personality traits that are associated with neotenous and mature qualities.

Prediction 3 Male raters associate long hair with the image of health, dominance, self-assurance, and intelligence, whereas short hair is associated with youth, honesty, care and emotion.

3. Method

3.1. Facial attractiveness

Facial measurements were made on the 10 most attractive and the 10 least attractive female faces, using ScionImage (version 4.0.2. Beta). A fixed set of points was marked on each face using the mouse. These points indicated the shape and position of internal features, that were similar to those used in other studies. Next we measured the size of the following facial traits: eye width (EW), length of forehead (LF), length of chin (LC), and face height (FH). We selected only these facial traits because they can possibly be covered by head hair, thus are visibly modifiable by the different hairstyles. For the analysis below we have divided each of the first three measures by face height (FH), to correct for differences in sizes of faces. Thus three indices of facial proportions were produced: relative eye width (EW/FH), relative length of forehead (LF/FH), and relative length of chin (LC/FH). These features were regarded as signals of neoteny.

3.2. Hairdressing and attractiveness judgments

The investigation was implemented as a part of a block of experiments that is described in Mesko and Bereczkei (2004). 77 female subjects were recruited from the university's undergraduate population. Their mean age was 21.9, with a range between 18 and 29. We took photo portraits of all the female subjects and these were scanned into a computer. For the photographs, the subjects were asked to pull their hair back from their faces and fix it with clips so that the length and style of their hair could not be seen. This image was called

“basic” face. Thirty young men as raters were asked to judge the attractiveness of the basic faces on a 1-6 scale. On the basis of their judgments, 20 individual faces were selected from the original sample of 77 females: the 10 most attractive, and the 10 least attractive women.

In the second step, different hairstyles were adjusted on the basic faces of the selected 20 women with the help of a computer program. These coiffures were the following: short, medium-length (half-long), and long. They were selected from a large set of hairstyles provided by a computer program (Cosmopolitan My Style) that is widely used in hairdressing salons. Then another group of 82 male raters were asked to judge the attractiveness of the selected 20 women, who were presented with the 4 different hairstyles (basic face + 4 coiffures). Thus 80 individual female faces were shown to each male rater. Finally, we calculated the effect of hairstyles on attractiveness by subtracting the scores of the basic face pictures from those of the haired ones. In other words, we measured the shifts in attractiveness judgments from the basic faces to the faces with various hairstyles.

Male raters were also asked to rate female faces on 10 different attributes, using a seven-point Likert scale for each rating. These attributes were: young, dominant, independent, feminine, honest, intelligent, healthy, caring, emotional, and self-assured. Trait ratings (1-7) were done for women with short and long hair. In order to avoid interaction with facial attractiveness, only women with equal scores of attractiveness on “basic face” were compared.. This means that, the 10 least attractive women and the 10 most attractive women were rated on these attributes, and mean scores were separately constructed for both groups. This procedure yielded 40 female faces with mean ratings for all 10 attributes.

4. Results

4.1. Facial measurements

Comparing basic faces (faces without visible head hair), significant differences between the most and least attractive girls were found in the three measured facial traits. The former proved to have higher foreheads, larger eyes, and smaller chins than the latter (forehead: $t = -18.703$, $p < 0.001$; eyes: $t = -4.029$, $p < 0.05$; chin: $t = -10.330$, $p < 0.001$). These differences indicate different values on the scale of neoteny; the most attractive women have higher neonate qualities than the others.

4.2. Attractiveness of faces with various hairstyles

The results of the Bonferroni comparison pairwise test revealed that long hair and medium-length hair enhanced the female subjects' facial attractiveness that had been previously judged in the basic face experiment ($F(1,47) = 14.32$, $p < 0.001$). Figure 1 shows that this increase in the perceived physical beauty was much more pronounced for women whose face (without visible head hair) was rated as less attractive than those with a more attractive face ($F(6,282) = 38.96$, $p < 0.001$). However, the absolute differences in attractiveness judgments are mainly due to the extension of neonate characters; hairdressing in itself did not reverse the original differences in aesthetic evaluations based solely on facial features. Figure 2 shows the following trend in attractiveness judgments: high neonate character (big eyes, large forehead, small chin) + long hair > high neonate character with short hair > low neonate character + long hair > low neonate character + short hair.

Figure 1 about here

These results also support Prediction 2. Women with high neonate quality in the center of the face and long hair as a maturity feature at the periphery were the highest valued by male raters, whereas the reverse composition (maturity character on the center, neonate character at the periphery) was judged as the least attractive (Figure 2).

Figure 2 about here

4.3. Facial features, hair length, and personality traits

Table 1 shows that hair length deeply influences the perceived personality traits in the predicted directions in groups of both the most and the least beautiful women. Mean scores for all 20 women have also shown significant differences between the effects that short and long hair have on judgments of personality characters. The majority of differences in the associated personality traits fit our prediction 3. Long hair is more likely to convey mature qualities such as feminine, intelligent, dominant, and healthy. Short hair rather signals personality traits that are associated with neoteny: honest, caring, and emotional. Differences in self-assurance, independence, and youth were not significant.

Table 1 about here

5. Discussion

The Multiple Fitness Model states that responding to physical appearance is not a simple process but is a function of several dimensions of features with different meanings.

Characteristics of hair and face influence attractiveness decisions independently, suggesting that they signal different aspects of physical beauty.

Female facial attractiveness was mainly due to the presence of neonate features. Women with larger eyes, higher forehead, and smaller chin were judged as more attractive than those with a lower neonate quality. This finding corresponds with other studies that have showed that, in general, when judgments about heterosexual attractiveness were made, facial cues signaling maturity and dominance diminished female attractiveness (Keating 2002).

However, unlike facial features, hair appears to convey attractiveness through maturity characters. In accordance with prediction 1, long and medium-length hair were more likely to increase the women's attractiveness than short hair. Long hair enhanced the female subjects' facial attractiveness, regardless, of whether female faces without visible head hair ("basic faces") were valued high or low in the former study. In summary, mature hairstyle improved attractiveness of female faces displaying either neonate or mature morphological traits.

It is interesting that in the context of the female face, neonate features are proved to primarily improve attractiveness, whereas in the context of cranial hair maturity character is crucial in attractiveness judgments. This difference may be interpreted in the Good Genes Sexual Selection Model (Grammer et al. 2003, Johnston et al. 2001, Thornhill and Grammer 1999). One of the main tenets of this model – especially the Zahavi-principle - claims that in order for a feature to reliably signal physical attractiveness it should be costly. Since sexual displays on the face, especially estrogen- and testosterone-dependent traits, are costly – steroids are known to negatively affect immunocompetence –, only people with good genetic conditions (e.g. heterozygosity) can afford to develop them. Similarly, if the development and maintenance of scalp hair is costly in terms of metabolism and time allocated for its care, only a fraction of people can afford to grow healthy and long hair. Indeed, several studies have suggested that during ontogenesis hair formation is very expensive in that it shows a high

growth rate and requires a high level of energetic expenditure (Dawber, Berker, and Wojnarowska 1998, Ebling, Dawber, and Rook 1986). Since the development of long hair requires a large amount of resources from the organism, it may reliably signal a high phenotypic and genetic quality of the bearer.

Another result of our study was that those women are judged as the most attractive who have neonate features in the center of their faces (large eyes, small chin) and have maturity qualities (long hair) at the periphery. In general, central facial traits may signal youth as a primary cue of the female's reproductive value, whereas features far from the central position of the face seem to signal maturity and health as important cues of survival capacity that could be transmitted to offspring. This result supports again the assumption inferred from the Multiple Fitness Model that hair length and facial features contribute to different types and aspects of attraction. Hairdressing has a separate effect on physical attractiveness that nevertheless proved to be weaker than the effect of facial traits. In other words, cranial hair is far less decisive in shaping physical attractiveness than facial traits measured on "basic face": on average more beautiful women with short hair were more highly valued than less beautiful women with long hair.

Another finding of our study is that hair length influences not only physical attractiveness but certain personality judgments as well. Former research has found a large effect of attractiveness judgments on the perceived personality traits; people who are judged as different in physical attractiveness are expected to have different personality traits. We attributed various psychological traits to individuals whose hair length was different but the perceived degree of their physical attractiveness was the same. In accordance with prediction 3, certain features of female hairdressing advertise desirable social and psychological traits. Long hair was associated with an image of maturity, with features such as dominant,

intelligent, feminine, and healthy, whereas short hair signaled personality traits that are associated with neoteny: honest, caring, emotional.

An important question is, what mediates the relationship between attractiveness ratings on scalp hair and perceived social and psychological traits? There are several explanations to this question (Zebrowitz and Rhodes 2002).

One possibility is that hair length and style directly convey honest messages about biological fitness. According to the good genes sexual selection theory, as we have seen, the preferred features on face and body reliably signal the genetic quality of mates. As an indirect support of the good genes theory, our former study has shown a strong positive effect of long hair on the female's perceived health (Mesko and Bereczkei 2004). The present study has revealed that long hair conveys psychological cues that are regularly associated with maturity and biological fitness: dominance, health, intelligence. Hinsz et al. (2001) found a positive correlation between women's self-rated health and hair quality, and concluded that hair length and hair quality may signal reproductive potential. To our knowledge, at present, there are no research results available for the real association between hair quality and the individual's actual health, measured by independent experts.

There are several non-evolutionary mechanisms that can account for a relationship between attractiveness of head hair and the associated psychological traits. Several theorists propose that preferences for attractive faces have evolved as the by-products of more general perceptual or recognition mechanisms (Enquist et al. 2002, Zebrowitz and Rhodes 2002). More closely, certain facial and bodily traits that are important in social relationships during childhood can be over-generalized to adults as attractive features. Our results indicating that long hair appears to display maturity and dominance may be interpreted in this theoretical framework. A recent Hungarian study has revealed that long hair is associated with social influence and status even in juvenile females (Baktay-Korsós 1999). Long-haired girls from

primary schools were found to be more attractive, have more friends, and they are regarded more popular in the community than short-haired girls. The authors proposed that since long hair is costly in social terms – its grooming requires more attention and time –, it provides a signal of high parental investment. By implying a favorable social environment, long hair thus may convey a high community status regardless of the age of the children. This social benefit may be transformed into adulthood as a signal of high mate value.

The social relationships and cultural expectations also deeply influence perception of attractiveness. Preferences about physical attractiveness do not exist in isolation but as a part of a constellation of valued social traits. Some evidence suggests that people show a preference for features typical of their own group, culture or race, when asked to rate facial attractiveness (Dion 2002). A similar appreciation of context on judgments of attractiveness can be applied to cranial hair. For example, compared with Caucasians, Asian Americans rated straight and black hair as more attractive, which may reflect their frequent exposure to such features (Wagatsuma and Kleinke 1979). Various hairstyles convey the message of group membership, sexual receptivity, transition to a different stage in the life course, etc. (Mesko and Bereczkei 2004, Morris 1985). Biblical and mythological stories all over the world imply that long hair has a symbolic meaning of power, activity, cheerfulness, vitality, and success. In many cultures wearing long hair or letting it down is considered as a female erotic signal that is frequently prohibited for married women in public life. Unmarried girls generally wear long hair but after marriage they have to cut it, tie it into a bun, or cover it with a scarf, indicating that men are no longer free to flirt with them. A recent study revealed that young American women tend to wear longer hair than older women, using long hair as a sign of their youth (Hinsz, Matz, and Patience 2001).

Hairdressing, similarly to facial attractiveness serves multiple functions; it may advertise genetic quality, personality traits, and socially desirable qualities. Further research is

needed to integrate these possible explanations in order to achieve a better understanding of physical beauty and its relation to hairstyles.

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