

Does Women's Hair Signal Reproductive Potential?

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This study explores the possibility that women's hair signals their reproductive potential. Evolutionary psychology and related approaches are considered as rationales for the belief that women's hair is a signal for mate selection and attraction. A sample of women were approached in public places and surveyed as to their age, hair quality, marital status, hair length, children, and overall health. A significant correlation between hair length and age indicated that younger women tend to have longer hair than older women. Hair quality was correlated with women's health. Consistent with the principle of intersexual selection, the results of this study indicate that hair length and quality can act as a cue to a woman's youth and health and, as such, signify reproductive potential. Future directions for research on women's hair are discussed. © 2001 Academic Press

Selection of a long-term mate is an endeavor pursued by most humans during their lives. However, the processes by which individuals select mates remains somewhat a mystery. One recent approach to the study of mate selection involves evolutionary psychology (Buss, 1994; Simpson & Kenrick, 1997). A core notion in the evolutionary approach to human mate selection is that men and women choose mates based on evolved preferences for certain characteristics (Buss & Kenrick, 1998). It is believed that these preferred characteristics are signaled to potential mates to

attract a partner (Grafen, 1990). In this article, we consider whether hair signals valued characteristics of women. Women's hair may display features that are attractive to men and thus play a role in the processes leading to mate selection.

One mechanism involved in mate selection is intersexual selection (Darwin, 1859). Intersexual selection suggests that there are characteristics that members of one sex desire in the other (Buss, 1996). Members of one sex who possess characteristics desired by the opposite sex have an advantage in attracting mates. According to sexual strategies theory (Buss & Schmitt, 1993), women desire attributes in a potential mate that suggest a willingness and ability to invest in them and their offspring. Accordingly, women tend to seek men who have high economic capacity and high social status and who are ambitious, dependable, intelligent, healthy, and willing to commit. In contrast, it is believed that men seek women who have a high potential to be reproductive, and so they prefer women who are young, healthy, and physically attractive (Buss, 1994).

Many qualities that are desired by members of the oppo-

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site sex cannot be directly observed (e.g., health), but can be *signaled* or inferred from related characteristics that are observable (Grafen, 1990). Women and men can produce numerous signals to demonstrate they possess qualities of interest to members of the opposite sex. Although a number of these characteristics have been examined in previous research (e.g., body shape; Singh, 1993), hair has not received much attention. Given the amount of time, money, and attention women in Western cultures spend on their hair (Etcoff, 1999), the psychological implications of women's hair have been surprisingly ignored (Rich & Cash, 1993). Women's hair is a potentially powerful and interesting signal of their desirable characteristics because it is highly visible and malleable. Consequently, the ways in which women make up their hair can be investigated for insights into how women might display signals implying desirable qualities that may attract potential mates. A primary question that interests us is "What are the desirable qualities that women's hair might signal?"

Given the view that men are attracted to women who are youthful, healthy, and physically attractive, we speculate that women's hair may signal one or more of these characteristics. Youth and health would be desirable characteristics because women tend to produce the most healthy offspring early in life (in a woman's early 20s; Etcoff, 1999). Reproductive value (the extent that individuals of a given age and sex will contribute to the ancestry of future generations) typically peaks around age 14 for females (Fisher, 1930). Thus, there is an advantage for males to mate with females who possess physical features associated with youth and health because these women are more likely to bear children, more children, and children who will survive.

Women's hair can signal youth and health. Healthy, shiny, and strong hair can signal overall physical health (Etcoff, 1999). Hair that is less healthy may have been damaged due to illness, signaling a lack of overall health, and so deter potential mates. Moreover, women's hair becomes darker, more coarse, and brittle after a full-term pregnancy (Symons, 1995). Consequently, women who have already borne children may have hair that is distinguishable from women who have not yet borne children. In addition, women's hair can signal their relative age (i.e., graying hair). These age-related features of women's hair should make women seem less desirable because of their possible link to menopause and the inability to bear children.

The length of women's hair may also signal specific characteristics (Terry & Krantz, 1993). If a woman has more desirable qualities to demonstrate with her hair, then more hair should provide a better signal to those characteristics (occupy more space in the visual field). Longer hair on a woman would better signal her desirable features to potential mates (e.g., health and youth). Conversely, if a woman's hair indicates less desirable qualities (e.g., poor

health), then she may keep her hair short to minimize a poor display. If longer hair on women is generally desirable to men, then females who want to attract a mate should also express a desire for longer hair in the hopes that it will aid in mate attraction. Indeed, Jacobi and Cash (1994) found that women believed men prefer women with longer hair.

Substantial research has considered how the physical characteristics of males and females can influence mate attraction and selection through social and cultural processes (Berscheid & Walster, 1978; Etcoff, 1999; Jackson, 1992). Women's hair may also have social significance, such as indicating their reproductive and relationship status (i.e., single, engaged, married, widowed, or divorced). Women and men in many societies use cues to indicate that they are already involved in a relationship (e.g., rings on ring fingers). If women's hair can attract potential mates, then once women have a long-term mate, their hair is not needed as a cue. Consequently, women may allow their hair to change in a way that is less likely to attract mates. Given that hair length is relatively easy to change, we speculate that women who have children or who are in established relationships with mates will have shorter hair than women not in established relationships or without children. It should be recognized that women's reproductive and relationship status are not independent of age. Women who have not yet borne children are generally younger than those who have, and older women are more likely to have reproduced. Also, because the development of stable, satisfying relationships occurs as women enter adulthood, relationship status will not be independent of age. This lack of independence will be addressed in our analyses.

Women's hair might relate to and signal one or more characteristics of a woman: youth (age), health, reproductive status, and relationship status. If women's hair reflects reproductive or relationship status alone, then women's hair would be a social cue. However, if women's hair is related to youth and health, then it could be a signal of reproductive potential. We conducted a study to investigate the potential of women's hair to signal specific characteristics to test our speculations.

We made four predictions regarding the length and quality of women's hair. (1) The quality of women's hair signals overall physical health. Women with better quality hair should have better overall health. (2) Women's hair is related to women's age. As women age, their hair will become shorter and be of poorer quality. This might occur for a variety of reasons. As women age, their hair quality may decline, so women may wear shorter hair to produce a smaller signal to their poor hair quality. (3) Hair could indicate a women's relationship status. There is evidence that women believe men like longer hair. Women who are not in an established relationship may display longer hair as a means of attracting a potential mate. Conversely, women who are in an established relationship may no longer desire

to attract a mate and thus be less interested in displaying long hair. (4) Women's hair could also indicate women's reproductive status and availability for reproduction. A woman who has physical constraints on reproduction (i.e., postmenopause, chronic illness, or pregnancy) should not be interested in attracting a mate for reproductive reasons and thus may have a shorter hairstyle. Because health, relationship status, reproductive status, and age are all variables that are not independent, we examine the relationships between these variables and hair length and quality, controlling for the effects of age.

METHOD

Participants

Females ($N = 230$) were interviewed at various public locations (e.g., parks and campuses) in the upper Midwest. These women, primarily of northern European ancestry, ranged in age from 13 to 73 years.

Procedure

Women were approached by a female researcher who said she was conducting a short interview for a study about women. A second research assistant stood at a distance while the interview was conducted and surreptitiously rated the participants' hair quality and hair length. A brief interview concerning basic demographic information was conducted if consent was given. At the end of the interview, the interviewer also rated the participants' hair length and quality based on observations made during the interview.

The women were initially asked their marital status (i.e., single, engaged, married, divorced, or widowed). If a participant said she was single, she was asked if she was seeing someone on a regular basis. If her response was yes, she was asked about how long she had been in the relationship. Based on responses to these two questions, a predictor variable was constructed to reflect *relationship status*: (1) single and not currently dating anyone, (2) single and in a new relationship of zero to 3 months, (3) single and in a steady relationship of 3 months to 1 year, (4) single and in a long-term relationship of over 1 year in length, (5) divorced or widowed, or (6) currently married.

The interview also inquired about the participant's overall *physical health* compared to other women her age. The response scale ranged from (1) *well below average* to (5) *well above average*. Next, the participant was asked if she had any children and for their ages. The participant was then asked if she knew of any physical complications that would not allow her to have children (coded as 1 = *no* and 2 = *yes*). To assess the participants' *age*, the interviewer stated: "If I could be so bold to ask, what is your age?" The next question asked whether the work the woman did in any way restricted the way she wore her hair and, if yes, to explain

the restrictions. Answers to this question were also coded 1 = *no* and 2 = *yes*. This question allowed us to examine a factor that might influence the way women wear their hair and thereby restrict relationships with other predictor variables.

An additional predictor variable was created to indicate the *reproductive status* of the participants. The lowest category was (1) women generally not considered to be capable of having children (under the age of 14, over the age of 45, or with some known physical complication that would no longer allow them to reproduce). Women who were between 14 and 45 years old were classified into other reproductive status categories: (2) currently pregnant, (3) newborn child 18 months old or younger, (4) married with children over 18 months old, (5) not currently married with children over 18 months old, (6) married or engaged with no children, or (7) single with no children.

Rating scales were developed to record the characteristics of each participant's hair. Four hair salons were contacted to learn standard terminology for hair length. A rating scale for *hair length* was developed in which short hair was described as above the collar (3–5 in.), medium-length hair fell between the ears and the shoulders (5–8 in.), and long hair was anything below the shoulders (8 in. or longer). Pictures from various fashion magazines representing the different hair lengths were used by the two raters to develop standards for rating hair length.

The same salons were asked to provide verbal descriptions of good to poor hair quality. From the information provided by the salons, five separate scales were generated to categorize participants' overall *hair quality*. The scales consisted of ratings from 1 to 5 reflecting poor to good quality on these characteristics: dull to shiny, poorly groomed to well groomed, frizzy to smooth, limp to volume, and brittle to strong. Fashion magazine pictures of the 10 hair characteristics were used by the raters to establish standards for evaluating these characteristics of women's hair.

RESULTS

Reliability of Ratings of Hair Length and Hair Quality

The two raters had a high level of agreement in their ratings of hair length (intraclass coefficient = .93). When the raters disagreed, their ratings were averaged to produce one hair length measure. The correlations between the two raters' ratings on the five scales of hair quality were not large: dull–shiny $r = .47$; frizzy–smooth, $r = .43$; limp–volume, $r = .30$; poor–well groomed, $r = .27$, brittle–strong $r = .35$. But the five measures of hair quality were found to have considerable internal consistency (Cronbach's $\alpha = .88$ for rater 1 and $\alpha = .67$ for rater 2). This pattern of results suggests that the five hair quality items may have measured one underlying characteristic of the

TABLE 1
Correlation Coefficients Among Predictor Variables, and with Women's Hair Length and Quality

	2	3	4	5	6	7	8
1. Hair Length	-.08	-.42*	.18*	-.28*	.00	-.22*	.30*
2. Hair Quality	—	-.18*	.13*	-.16*	.16*	-.14*	.02
3. Participant Age		—	-.42*	.72*	.05	.50*	-.21*
4. Reproductive Status			—	-.39*	.03	-.46*	.04
5. Relationship Status				—	.03	.41*	-.15*
6. Subjective Health					—	.09	.14
7. Physical Complications						—	.05
8. Occupational Restrictions							—

* $p < .05$.

women's hair (i.e., quality), so we averaged responses on the five items into one measure of hair quality. The two raters showed more agreement in their composite ratings of hair quality (intraclass coefficient = .59), and so one composite score was calculated for hair quality by averaging the responses to the five items across both raters.

Relationships among Measures

Our interest is in the relationships of hair length and hair quality with the primary predictor variables of participants' age, reproductive status, relationship status, and subjective health (see Table 1). Consistent with our prediction, women who were older had significantly shorter hair and poorer quality hair. Women considered high in reproductive status (i.e., single, without children) had significantly longer and better quality hair. Women higher in relationship status (i.e., married and of child-bearing age) had significantly shorter hair and poorer quality hair. Although subjective ratings of health did not correlate with hair length, better health was correlated with better quality hair, which is consistent with our prediction.

We also observed that women with physical complications that would not allow them to have children had significantly shorter hair and poorer quality hair. Women who have not yet had children had significantly longer hair, ($r = .32$) and better quality hair ($r = .17$). It is interesting to note that participants who said they had restrictions on how they could wear their hair at work had longer hair, although hair quality was not significantly correlated with hair restrictions.

Although we identified a number of correlations related to women's hair length and hair quality, it is clear that these predictor variables may not be independent (see Table 1). In particular, the age of the participant was significantly related to reproductive status, relationship status, and physical complications for having children. Consequently, we conducted regression analyses to predict hair length and hair quality, with participant age entered first and followed by reproductive status, relationship status, subjective health, physical complications, and occupational restrictions.

The regression analysis for women's hair length showed that participant's age was a significant predictor, $t(225) = -6.82$, $p < .0001$, accounting for 17% of the variation in women's hair length. When the other predictors were entered into the regression equation, only occupational restrictions associated with wearing their hair significantly predicted women's hair length, partial $r = .24$, $t(220) = 3.72$, $p < .0001$. The other predictor variables were unrelated to hair length. These results imply that women's age, not relationship or reproductive status, accounts for many of the relationships with hair length.

A similar regression analysis was conducted to examine which variables predicted hair quality. Participant age was again a significant predictor; hair quality declined with age, $R^2 = .03$, $t(225) = -2.70$, $p < .01$. The only other variable that significantly predicted women's hair quality was subjective health; better hair was associated with better health, partial $r = .19$, $t(220) = 2.80$, $p < .01$. The other predictor variables were unrelated to women's hair quality. These results suggest that it is youth and health that account for differences in women's hair quality.

We speculated that women with poorer quality hair would wear their hair shorter. Consistent with this speculation, a significant partial correlation ($r = .16$, $p < .02$) between hair quality and hair length was observed when participant's age was controlled.

DISCUSSION

This study explored how women's hair length and quality would relate to their age, health, reproductive status, and relationship status. The results suggest that as women age, their hair becomes shorter and of poorer quality and that women's health is positively correlated with their hair quality. These results lead us to conclude that hair length and hair quality may be signs of women's youth and health and, as such, signals to reproductive potential. The relations between reproductive status and relationship status and women's hair length and quality disappeared when the effects of the age was controlled. Occupational restrictions

on hair were also related to hair length, but the relationship was counterintuitive, with longer hair related to occupational restrictions.

This pattern of results suggests that age is a determining factor for women's hair length and quality. Controlling for the effects of age removed the relationships between hair length and the predictor variables, with the exception of occupational restrictions on hair. In addition, hair quality appears to be related to subjective health and participant's age. When the effect of age was controlled, only subjective health was predictive of hair quality. These data support our predictions that women's hair length and quality can be predicted by their age and health.

This study demonstrates that women's hair can serve as a signal of reproductive potential. Women's hair may signal to potential mates that they possess desirable characteristics. Therefore, women may also use their hair as a device to attract men. Buss (1988) investigated the tactics women use to signal high reproductive value and found that females groomed themselves in an attempt to appear healthy and young. The results of our study extend these findings by indicating that women may display their hair in a long and healthy fashion as a tactic for attracting potential mates. Our study does not address whether women use their hair strategically to attract mates, but it does suggest that males might respond to long and healthy hair to the degree they are interested in young and healthy women.

A significant correlation was found between women's hair length and quality. This finding provides limited support to our claim that women may wear their hair shorter when it is of poorer quality. If women's hair signals the desirable features of youth and health, then having longer hair may send stronger signals about these features. Likewise, if women's hair demonstrates less desirable characteristics, then women may choose to have shorter hair so that a weaker signal about these characteristics is sent.

We also found that women who had occupational restrictions on how they could wear their hair had longer hair. We suspected that younger women with occupations that restricted the way they could wear their hair would have shorter hair. Our analyses did not demonstrate such a relationship. Rather, the relationship between occupational restrictions and hair length may have arisen because restrictions on the way women wear their hair focus on longer hair. That is, only women who have longer hair are confronted by restrictions on how they can wear their hair. For women with shorter hair, these restrictions may not apply. This may explain the correlation we found between hair length and occupational restrictions on hair. Regardless, we are confident that occupational restrictions did not restrict the correlations between the predictor variables and hair length and quality.

A sociocultural perspective (Eagly & Wood, 1999; Jackson, 1992) could also be applied to explain some of the

results from our study. It could be argued that youth and health are particularly valued characteristics in Western cultures. Consequently, women whose hair demonstrates youth and health should be more valued in those cultures. This study, however, was conducted to test predictions based on the evolutionary psychology perspective, not of a sociocultural perspective. Clearly, there are sociocultural forces that affect women's hair (e.g., hair styles). This study indicates that there are also evolutionary forces related to reproductive potential that influence women's hair.

The display of women's hair probably reflects both sociocultural and evolutionary forces (see Buss, 1994, Eagly & Wood, 1999, and Jackson, 1992, for opinions about how evolutionary and sociocultural forces can combine to influence social behavior). Women may respond to sociocultural forces to wear their hair in certain ways, but those forces may be expressing evolutionary forces related to the fact that women's hair can signal youth and health. Moreover, sociocultural forces may actually amplify the evolutionary pressures so that women's hair emphasizes the characteristics important for mating (e.g., youth and health) and downplay other features that hamper differentiation between men and women. The ways that sociocultural and evolutionary forces interact to influence how women's hair is displayed were not examined in this study; however, women's hair does illustrate one way in which these forces may be highly intertwined in how they influence social behavior.

Limitations of This Study

As a single investigation into the implications of women's hair for mate selection and attraction, this study has several limitations. Many of these are a consequence of the nonobtrusive way in which the variables were assessed. For example, the data we collected can only be examined for correlational relationships between variables. Consequently, we cannot make claims about the causal effects of the predictor variables on women's hair length and quality. However, this study involved data based on a large number of observations of women's hair as it is naturally presented. Additionally, the data collected for this study were restricted to a Western society and a homogeneous population within that society. Generalizability of our results to other cultures may be limited, although Buss (1989) has demonstrated the cross-cultural nature of related effects.

A number of our measures were based on self-reports and so could have suspect validity. And although efforts were made to enhance the quality of the observations (e.g., multiple raters and the use of experts in defining variables), the measures we used were not always as reliable (e.g., hair quality) or precise (e.g., health) as we wanted. In addition, some of the predictor variables were derived from personal characteristics (e.g., relationship and reproductive status) rather than directly measuring the underlying constructs. Finally, the approach taken in this study did not permit us to

examine whether women's hair actually does signal desirable characteristics to males. We are working to study whether men do use women's hair to infer their youth and health, and if men use women's hair as a signal of other features relevant to mating and reproduction (cf., Matz & Hinsz, 2000).

Future Directions

There are many directions that future research could take regarding the role of women's hair in mate selection and attraction. For example, we speculated that the length of women's hair can act as a stimulus to signal desirable characteristics. And we observed that longer hair was correlated with the desirable characteristic of better quality hair. If a woman has more desirable qualities to demonstrate with her hair, then more hair should provide a better signal (more space in the perceptual field) of those characteristics. Of course, different mechanisms may lie at the heart of the relation between hair length and hair quality. Moreover, "big hair" on a woman may not only display good quality hair, but demonstrate it in a bolder and more salient fashion (Etcoff, 1999). Future research may provide us with a better understanding of the ways in which women's hair length is involved in mate selection and attraction.

Women's hair in cultural contexts. This research was limited to one relatively homogeneous region of the United States. Women's hair appears to take on other or additional meaning in other societies. For example, women in some Muslim cultures are encouraged to cover themselves from head to toe. Likewise, Catholic nuns have traditionally hidden from view their hair and their body shape, two possible cues to youth and health. Given that nuns take a vow of celibacy, they should not be interested in attracting a mate and so should not be motivated to display attracting cues. Whether intended or not, this body coverage severely restricts the signals that women can display to attract potential mates.

Women's hair also signals aspects of reproduction in other cultures. Ackerman (1991) states that some Orthodox Jewish women must cut off their hair when they marry so that their husbands will not find them too attractive and wish to have intercourse for reasons other than reproduction. When some countries were liberated in Europe during World War II, women had their hair sheared by other women because they fraternized with enemy soldiers (Morris, 1985). Maasai women of East Africa often have their heads shaved at the time of marriage and during the naming of a newborn child (Saitoti, 1980). These cases suggest that women's hair is used to signal a variety of aspects of mate selection and reproduction. Future research could examine cross-cultural consistency and variability in the implications of women's hair for reproduction, mate selection, and mate attraction.

Women's hair and its color. The color of women's hair also appears to convey meaning (Rich & Cash, 1993). Women may dye and tint their hair so that it is lighter. Because lighter hair is associated with younger women (hair becomes darker and more gray with age), women may lighten their hair to project a more youthful image (Etcoff, 1999; Matz & Hinsz, 2000). Certain stereotypes also appear to be associated with different hair colors (Clayson & Maughan, 1986). For example, some people believe that red-headed women have fiery and combustible dispositions and blond women have more fun, but are dumb. Do women change their hair color to incorporate certain aspects of these stereotypes into their images or to avoid being attributed the characteristics associated with their natural hair color? We speculate that a woman's hair color has meaning for her and that women's hair color projects meaning to others. The ways in which women's hair color influences person perception and self-perception, and the intentions of women who color their hair to influence impressions and self-perceptions, are areas ripe for consideration (Matz & Hinsz, 2000).

Women's hair and self-image. The conventional wisdom provided by many women's magazines is that a woman's hair is part of her identity and self-image. Women appear willing to change their hair (style and length) when they want a change of image. Moreover, women recognize that their hair signals different things. For example, women with long hair often wear it pulled up in business settings. However, they "let their hair down" in other social or intimate settings (Ackerman, 1991; Morris, 1985). Women who lose their hair, due to disease or cancer therapies, sometimes feel that they have lost part of themselves. The loss of a woman's hair is an assault on her identity or self-image. Women may cover their heads or put on wigs to maintain the image that their hair projects. The implications of women's hair for their self-images are not well understood and deserve further attention.

Men's hair as a signal. This study focused solely on women's hair as a signal to reproductive potential. What about the possibility that men's hair signals important characteristics to women (Etcoff, 1999; Morris, 1985)? Men also have facial hair that may signal reproductive potential (Morris, 1985). What might men's hair signal? Clearly, facial hair appears after puberty and does not fill in until adulthood. Also, some men's hair turns gray when they age. So, men's hair could indicate maturity. Men's hair could also demonstrate a "Samson effect" by signaling strength or potency (Morris, 1985). Some men report a feeling of weakness when they receive an extensive haircut, just as did Samson of biblical fame. Moreover, men may also feel an assault on their identity or self-images when they lose their hair (Cash, 1990). The meaning of the signals that men's hair projects is another issue to be addressed in future research.

Summary

The results of this study suggest that women's hair may act as a signal to their reproductive potential because it signifies youth and health. In this respect, the results are consistent with previous findings from evolutionary psychology indicating that females and males display characteristics that signal qualities desired by members of the opposite sex (Buss, 1994). Females and males have an attraction toward people with specific physical characteristics (e.g., long and healthy hair) because they signify desirable qualities (e.g., youth and health). This study contributes to the growing literature of physical characteristics that serve as signals to underlying characteristics important for mate attraction and selection. Although there are limits to this study, as there are for every study, our results do draw attention to the significance of women's hair and suggest several directions for future research in this area.

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