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The role of facial hair in women's perceptions of men's attractiveness, health, masculinity and parenting abilities

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ABSTRACT

Facial hair strongly influences people's judgments of men's socio-sexual attributes. However, the nature of these judgments is often contradictory. The levels of intermediate facial hair growth presented to raters and the stage of female raters' menstrual cycles might have influenced past findings. We quantified men's and women's judgments of attractiveness, health, masculinity and parenting abilities for photographs of men who were clean-shaven, lightly or heavily stubbled and fully bearded. We also tested the effect of the menstrual cycle and hormonal contraceptive use on women's ratings. Women judged faces with heavy stubble as most attractive and heavy beards, light stubble and clean-shaven faces as similarly less attractive. In contrast, men rated full beards and heavy stubble as most attractive, followed closely by clean-shaven and light stubble as least attractive. Men and women rated full beards highest for parenting ability and healthiness. Masculinity ratings increased linearly as facial hair increased, and this effect was more pronounced in women in the fertile phase of the menstrual cycle, although attractiveness ratings did not differ according to fertility. Our findings confirm that beardedness affects judgments of male socio-sexual attributes and suggest that an intermediate level of beardedness is most attractive while full-bearded men may be perceived as better fathers who could protect and invest in offspring.

1. Introduction

Androgen-dependent facial and bodily traits are positively associated with men's health (Thornhill & Gangestad, 2006), immunity (Rantala et al., 2012), dominance and competitive ability (Archer, 2009). Masculine men may also achieve greater mating and reproductive success (Rhodes, Simmons, & Peters, 2005). Yet averaged across experiments, women either prefer less masculine faces (Perrett et al., 1998) or weakly prefer masculine faces (Rhodes, 2006). However, women's preferences for facial cues of masculinity vary, growing strongest when men are rated for short-term relationships (Little, Connely, Feinberg, Jones, & Roberts, 2011), and during the most fertile part of their menstrual cycle (Gangestad & Thornhill, 2008).

The beard is a highly sexually dimorphic androgen-dependent trait that varies markedly among men (Randall, 2008). While this implies a sexually selected origin for beardedness, there is no consensus on the relative importance of female mate choice and male-male competition in shaping facial hair. Given that facial hair growth begins at puberty and continues throughout adulthood, it is not surprising that beards augment perceptions of maturity and masculinity (Addison, 1989; Neave & Shields, 2008). However, associations between other personality traits and beards are highly polarized. On the one hand, bearded men are ascribed positive attributes such as self-confidence, courage, sincerity, generosity and industriousness (Kenny & Fletcher, 1973; Pellegrini, 1973; Hellström & Tekle, 1994). On the other hand, beards are judged as less socially appeasing and more aggressive (Addison, 1989; Muscarella & Cunningham, 1996; Neave & Shields, 2008).

Findings on the attractiveness of facial hair are equally mixed. In some cases full beards increased male attractiveness (Pellegrini, 1973; Hatfield & Sprecher, 1986; Reed & Blunk, 1990), while others found they did not (Feinman & Gill, 1977; Wogalter & Hosie, 1991; Muscarella & Cunningham, 1996; Dixson & Vasey, 2012). These mixed findings may have resulted, in part, from using written questionnaires (Feinman & Gill, 1977), fake beards (Wood, 1986) or facial hair created using make-up pencils (Muscarella & Cunningham, 1996). Where natural photographs have been used, typically only full beards or clean-shaven faces were presented (e.g. Dixson & Vasey, 2012), which does not capture variation in men's ability to grow facial hair. Interestingly, Neave and Shields (2008) found using computer-generated images that varied in grades of facial hair that light stubble was most attractive to women.

In the present study, a sample of men, each of whom were photographed as clean-shaven, lightly stubbled, heavily stubbled and fully bearded, were rated for attractiveness, healthiness, masculinity

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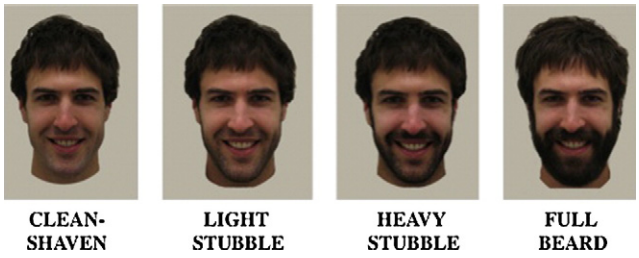

Fig. 1. An example of the stimuli used in this study. Images show the same man when clean-shaven, with light stubble, heavy stubble and a full beard.

and parenting abilities. Analysis 1 compared ratings between men and women. We predicted that men would judge full beards more favorably than women because of the strong role of beards in judgments of social dominance and threat (Dixson & Vasey, 2012). Conversely, we predicted that women may judge more bearded faces to be more attractive than clean-shaven faces but that a threshold of masculinity may be preferred, with lightly stubbled faces considered most attractive (after Neave & Shields, 2008). Women's preferences for masculine traits are known to become stronger during the late follicular, more fertile, period of the menstrual cycle when any benefits of mating with a more masculine partner can be realized (Gangestad & Thornhill, 2008). Thus, in Analysis 2 we tested the prediction that heavier stubble and hence greater masculinity would be more attractive at the period of the menstrual cycle when conception is more likely.

2. Materials and methods

2.1. Stimuli

Ten men of European descent (mean age ± SD = 23.50 ± 3.57 years), each of whom had dark brown head and facial hair were photographed in each of four conditions in the following order: fully bearded (at least 6 weeks without shaving), clean-shaven, with 5 days (light stubble) and 10 days of beard growth (heavy stubble). Men posed smiles generated using the Facial Action Coding System (Ekman, Friesen, & Hager, 2002). Photographs were taken using a Canon digital camera (8.0 megapixels resolution), 150 cm from the participant under controlled lighting. Images were cropped so only the face and neck were shown (Fig. 1).

2.2. Procedure

Studies were completed online at www.bodylab.biz. Participants viewed each of the 10 faces once, with 4 faces clean-shaven and 2 faces in each of the other three categories of facial hair. Which faces were assigned to which condition was determined at random for each participant, as was the order in which faces were presented. Subjects rated each face for attractiveness, healthiness, masculinity and parenting abilities using six-point Likert scales (0 = very low–5 = very high). After completing the ratings participants provided details on their age, sex, ethnicity and sexual orientation. Female participants also stated how many days ago their most recent menstrual bleeding began, whether they were pregnant, post-menopausal or using hormonal contraceptives.

2.3. Statistical analyses

Attractiveness, health, masculinity and parenting ability ratings were dependent variables in a MANOVA where facial hair was the within-subject factor. Sex in Analysis 1 and reproductive status in Analysis 2 were entered as between-subject factors.

2.4. Analysis 1: Male and female perceptions of beardedness

2.4.1. Analysis 1: Participants

Self-identified homosexual and asexual participants were excluded from analyses, as were female participants that were pregnant, were post-menopausal or used hormonal contraceptives. Eight percent of the female sample were bisexual and were retained, as they are sexually attracted to men as well as women. Their inclusion did not interact with any dependent variables (all P values ≥ 0.249). The final sample size was 177 heterosexual men (mean age ± SD = 32.18 ± 10.30 years) and 351 women (27.94 ± 8.23 years), of whom 79.9% were European, 8.4% were Asian, 4.2% were Native American, 1.8% were African, Middle Eastern or Australasian and 5.7% elected not to define their ethnicity.

2.4.2. Analysis 1: Results

There was a significant main effect of facial hair and a significant sex × facial hair interaction for attractiveness ratings (Table 1). Women rated heavy stubble as significantly more attractive than clean-shaven, light stubble and full beards (all $t_{351} \geq 3.51$, all

Table 1
Multivariate repeated-measures analysis of variance of the effects of facial hair and sex on perceptual ratings.

Within-subject effects										
	Facial hair					Facial hair × sex				
Pillai's trace	0.373					0.040				
	F	df_n	df_d	P	η_p^2	F	df_n	df_d	P	η_p^2
MANOVA	25.55	12	515	<0.001	0.373	1.80	12	515	0.045	0.040
Attractiveness[a]	7.02	2.8	1491.6	<0.001	0.013	2.66	2.8	1491.6	0.050	0.005
Parenting[a]	44.74	2.9	1521.1	<0.001	0.078	1.09	2.9	1521.1	0.349	0.002
Health[a]	14.03	2.9	1548.5	<0.001	0.026	2.58	2.9	1548.5	0.053	0.005
Masculinity[a]	50.19	2.9	1525.4	<0.001	0.087	0.57	2.9	1525.4	0.631	0.001

Between-subject effects					
	Sex				
Pillai's trace	0.053				
	F	df_n	df_d	P	η_p^2
MANOVA	7.30	4	523	0.000	0.053
Attractiveness	5.84	1	526	0.016	0.011
Parenting	5.17	1	526	0.023	0.010
Health	1.23	1	526	0.267	0.002
Masculinity	2.67	1	526	0.103	0.005

[a] Greenhouse–Geisser adjusted df (rounded to one decimal place).

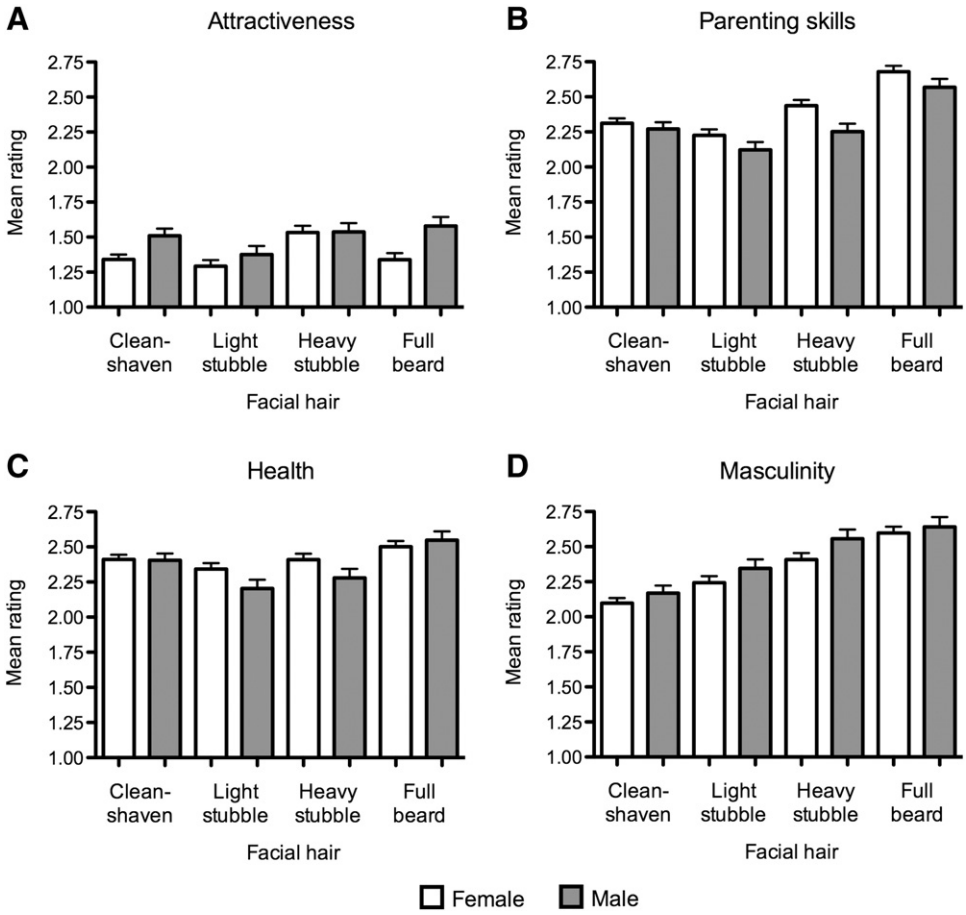

Fig. 2. Mean ratings (+SD) for clean-shaven, light stubble, heavy stubble and full beards when judging physical attractiveness (A), parenting skills (B), health (C) and masculinity (D). White bars show female ratings and gray bars show male ratings.

$P < 0.001$). In contrast, men rated full beards, heavy stubble and clean-shaven as more attractive than light stubble (all $t_{176} \geq 2.17$, all $P < 0.05$). Men gave higher attractiveness ratings than women for full beards ($t_{526} = 2.97$, $P = 0.003$) and clean-shaven faces ($t_{526} = 2.83$, $P = 0.005$), but not for light ($t_{526} = 1.09$, $P = 0.274$) or heavy stubble ($t_{526} = 0.04$, $P = 0.968$; Fig. 2A).

Facial hair significantly affected ratings of parenting abilities, health and masculinity. However, the only main effect of sex was for parenting

Table 2
Multivariate repeated-measures analysis of variance of the effects of facial hair and fertility on ratings.

Within-subject effects										
	Facial hair					Facial hair × fertility				
Pillai's trace	0.478					0.071				
	F	df_n	df_d	P	η_p^2	F	df_n	df_d	P	η_p^2
MANOVA	32.72	12	428	<0.001	0.478	1.32	24	858	0.139	0.036
Attractiveness[a]	8.08	2.9	1267.0	<0.001	0.018	0.26	5.8	1267.0	0.952	0.001
Parenting[a]	38.83	2.9	1284.6	<0.001	0.081	1.20	5.9	1284.6	0.306	0.005
Health[a]	3.18	2.9	1288.9	0.024	0.007	1.07	5.9	1288.9	0.379	0.005
Masculinity[a]	55.56	2.9	1264.4	<0.001	0.112	2.05	5.8	1264.4	0.059	0.009

Between-subject effects					
	Fertility				
Pillai's trace	0.020				
	F	df_n	df_d	P	η_p^2
MANOVA	1.10	8	874	0.364	0.010
Attractiveness	0.48	2	439	0.619	0.002
Parenting	0.07	2	439	0.931	0.000
Health	0.30	2	439	0.740	0.001
Masculinity	3.00	2	439	0.051	0.013

[a] Greenhouse–Geisser adjusted df (rounded to one decimal place).

abilities, with women giving significantly higher ratings than men ($t_{526} = 2.27, P = 0.023$). There was a marginally significant interaction between sex and facial hair for health ratings (Table 1), so that compared to men women gave higher health ratings for light and heavy stubble but not clean-shaven or full beards (Fig. 2C). However, none of the paired comparisons were statistically significant (all $t_{526} \leq 1.82$, all $P > 0.05$). There were no other interaction effects involving sex (Table 1). Full beards were rated significantly higher than other facial hair categories for parenting abilities (all $t_{527} \geq 6.78$, all $P < 0.001$; Fig. 2B), healthiness (all $t_{527} \geq 2.87$, all $P < 0.01$; Fig. 2C) and masculinity (all $t_{527} \geq 3.91$, all $P < 0.001$; Fig. 2D).

2.5. Analysis 2: Female fertility and perceptions of beardedness

2.5.1. Analysis 2: Participants

Analysis 2 used a sub-sample of Analysis 1 in which only the responses of regularly cycling women who reported the onset of menstrual bleeding between 0 and 28 days ago were used. Participants whose menstrual bleeding fell between 0–5 and 15–28 days before the trial were categorized as the "low-fertility" phase and those whose bleeding fell between days 6 and 14 were classed as the "high-fertility" phase (Penton-Voak et al., 1999; Little, Jones, & DeBruine, 2008). A total of 182 women were in the low-fertility category (mean age =28.80 ± 8.53 years), 100 women were in the high-fertility category (mean age = 27.93 ± 6.94 years) and 160 women used hormonal contraceptives (mean age = 27.12 ± 6.63 years). More than half of the participants (78.3%) were European, 8.6% were Asian, 3.9% were Native American, 1.5% were African, Middle Eastern or Australasian and 7.7% elected not to define their ethnicity.

2.5.2. Analyses 2: Results

Facial hair significantly affected women's ratings of attractiveness, parenting abilities, health and masculinity (Table 2). Fertility and its associated interactions with other factors did not alter ratings, apart from a marginal effect on masculinity ratings. Rated masculinity increased linearly as facial hair increased, with full beards receiving significantly higher ratings than clean-shaven, light and heavy stubble (all $t_{441} \geq 4.29$, all $P < 0.001$). However, high-fertility participants gave significantly higher ratings for full beards than low-fertility participants ($t_{280} = 3.68$, $P < 0.001$) and contraceptive users ($t_{258} = 2.62$, $P = 0.009$; Fig. 3D).

Irrespective of fertility, women's attractiveness ratings were significantly higher for heavy stubble than other degrees of beardedness (all $t_{441} \geq 3.63$, all $P < 0.001$; Fig. 3A). Full beards received significantly higher parenting skill ratings than other levels of facial hair (all $t_{441} \geq 5.67$, all $P < 0.001$; Fig. 3B). Full beards also received higher health ratings than light ($t_{441} = 2.81$, $P = 0.005$) and heavy stubble ($t_{441} = 2.24$, $P = 0.025$), but not clean-shaven faces ($t_{441} = 0.97$, $P = 0.335$). Clean-shaven faces were judged as healthier than light stubble ($t_{441} = 2.13$, $P = 0.033$) but not heavy stubble ($t_{441} = 1.56$, $P = 0.121$; Fig. 3C). Very similar results were found using a measure of likelihood of conception (see Supplementary material, available on the journal's website at www.ehbonline.org).

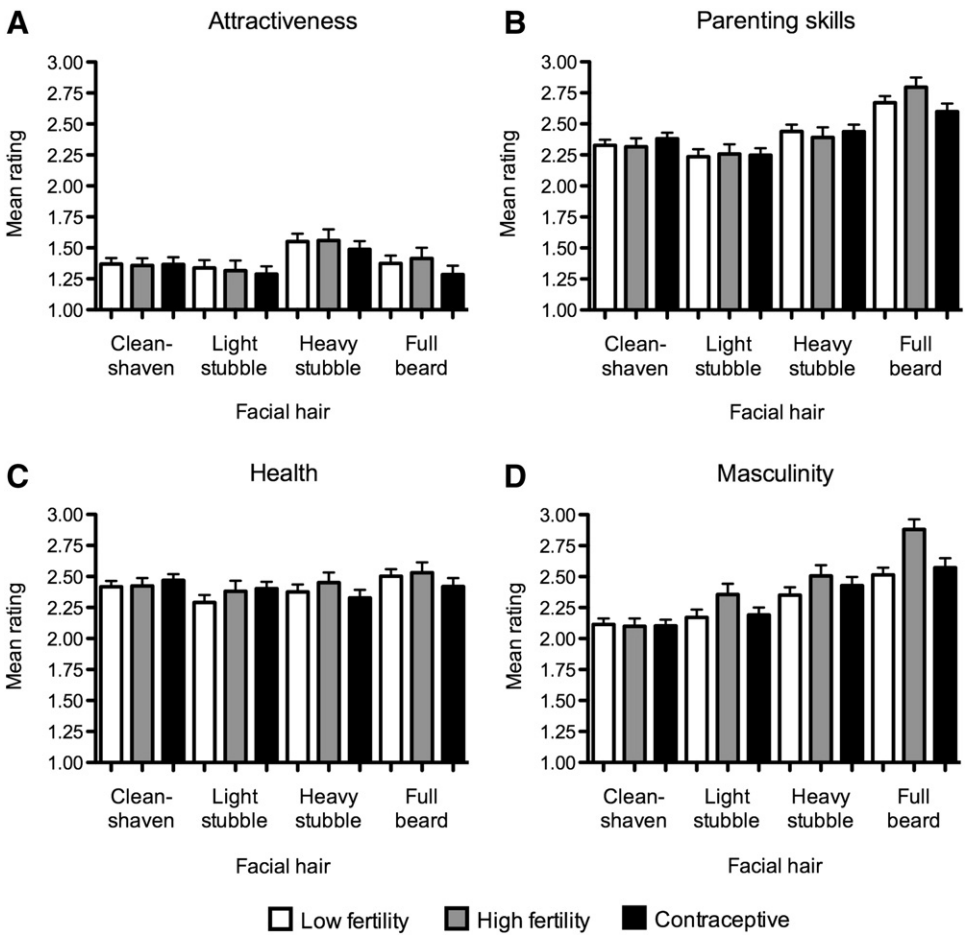

Fig. 3. Women's mean ratings (+SD) for clean-shaven, light stubble, heavy stubble and full beards when judging physical attractiveness (A), parenting skills (B), health (C) and masculinity (D). Data are split by participant's fertility with white bars depicting low fertility, gray bars representing high fertility and black bars indicating ratings by participants who were using hormonal contraceptives.

3. Discussion

While ratings of masculinity rose monotonically with beardedness, the effects of facial hair on attractiveness, health and parenting ratings were non-linear. In almost all cases, light stubble received the lowest ratings, with heavy stubble or full beards judged more favorably and clean-shaven faces faring as well or almost as well. Attractiveness was the only property that males and females rated differently, but the interaction between sex and health ratings was marginally significant as women gave higher health ratings for light and heavy stubble than men. Both men and women rated light stubble as least attractive and heavy stubble as most (women) or equal most (men) attractive. However, women rated clean-shaven and fully bearded faces less attractive than heavy stubble. The fact that women and men differ significantly in how they rate the attractiveness of different levels of beardedness may reflect dual signaling functions of male facial hair.

Facial hair correlates not only with maturity and masculinity, but also with dominance and aggression (Neave & Shields, 2008). Men, judging other men, might be sensitive to the overall level of masculine threat and aggression signaled through full beards (Dixson & Vasey, 2012). Women, by contrast, may balance the benefits of an intra-sexually competitive masculine partner against the costs of mating with a too-masculine partner. Our finding that women prefer heavy stubble contrasts with previous studies in which attractiveness ratings were highest for either clean-shaven faces (Feinman & Gill, 1977; Wogalter & Hosie, 1991; Muscarella & Cunningham, 1996) or full beards (Pellegrini, 1973; Hatfield & Sprecher, 1986; Reed & Blunk, 1990). However, it is similar to Neave and Shields (2008), who found women preferred light stubble, with the lowest ratings given to fully bearded and clean-shaven faces. Neave and Shields (2008) found, as we did, that perceived masculinity rose linearly with facial hair. They concluded that light stubble is preferred over clean-shaven faces as an unambiguous signal of post-pubertal sexual maturity, while not achieving the overly masculine appearance of heavy stubble and full beards. Interestingly, in our study light stubble was perceived as the least healthy, particularly by men, lowest on parenting skills and the least attractive. Although these effects are subtle and further research is necessary, it may be that these negative ratings reflect discrimination against the more patchy light stubble and suggests a threshold of density and distribution may be necessary for beards to function as an attractive signal. Our study does not include a sufficiently broad sample of males to tease apart this interaction and future research that includes a greater sample with a wider range of natural variation of beardedness would be valuable.

Women's discrimination against full beards in attractiveness ratings may be due to costs of mating with a too-masculine man. Highly masculine men tend to have lower romantic attachment, less interest in long-term relationships and report engaging in more short-term relationships (Rhodes et al., 2005; Boothroyd, Jones, Burt, DeBruine, & Perrett, 2008). While a highly masculine partner might impose costs, women's preferences are known to shift more towards masculine men when the likelihood of conception is higher (Gangestad & Thornhill, 2008). We found that participants with higher potential fertility gave full-bearded faces higher masculinity ratings than did low-fertility participants, suggesting a sensitivity of women in the fertile phase to masculinity. However, fertility was unrelated to attractiveness ratings, as thick stubble was always most attractive and light stubble always least attractive. Our findings are similar to a recent study demonstrating that women's preferences for facial hair do not change with fertility or among pre-menopausal, post-menopausal or pregnant women (Dixson, Tam, & Awasthy, 2012). Thus, although facial hair is a clear signal of sexual maturity and masculinity, preferences among women appear not to be linked to reproductive status or fertility, as is the case for numerous sexually dimorphic androgen-dependent traits. However, our study used a count-back system to estimate fertility. While this is common in studies of women's mate preferences, such procedures are prone to measurement error, inaccuracies in recalling the onset of bleeding and natural individual variation between participants in onset and duration of the period of high fertility (Fehring, Schneider, & Raviele, 2006; Small, Manatunga, & Marcus, 2007). Future studies would benefit from using more direct measures of fertility to fully test shifts in preferences for facial hair over the menstrual cycle.

In addition to being perceived as less invested in long-term romantic relationships, masculine-looking men are perceived as likely to provide low paternal investment (Perrett et al., 1998; Kruger, 2006). Our results suggest that this does not generally hold for beards. Indeed, little is known regarding the socio-sexuality of men who typically choose to wear beards and whether or not they are less romantically committed to long-term relationships than men who opt to be clean-shaven. Despite the strong association between beards and perceptions of social dominance, threat and aggressiveness (Neave & Shields, 2008; Dixson & Vasey, 2012), we found that women rated parental abilities of men with full beards highest. However, beards augment perceived age, social maturity, industriousness, sincerity and ambition (Kenny & Fletcher, 1973; Pellegrini, 1973; Hellström & Tekle, 1994), all of which are strongly valued by women in long-term partners (Buss, 1989). Further, masculine traits associated with aggression and dominance may provide direct benefits such as protection to long-term mates (Snyder et al., 2011), which could explain why beards received higher parental ability ratings. Alternatively, our use of smiling stimuli may have offset the negative effects associated with higher masculinity attributed to full beards. Thus, compared to neutral facial expressions, a posed open smile is judged as significantly more attractive, kind, sympathetic, ambitious and intelligent (Otta, Abrosio, & Hoshino, 1996). Facial hair is known to interact with facial expression in perceptions of emotional states (Dixson & Vasey, 2012). Thus, the combination of pro-social attributes ascribed to smiling faces could explain why full beards in concert with smiling facial expressions were judged to have greater parenting skills despite the higher ratings for masculinity.

It is possible that prevailing cultural perceptions of facial hair also contribute to how beardedness was judged in our study. Frequencies and styling fashions of men's beards varies over time and among cultures. For example, the frequency of mustaches, sideburns, full beards and clean-shaven appearances among men in London from 1842 to 1972 each had distinct peaks in popularity (Robinson, 1976). While this may merely reflect arbitrary trends in tastes, Barber (2001) found using Robinson's data that men were more bearded when there were more men of marriageable age in the mating market. Preferences for masculine facial shape are known to be greater among women living in countries with the lowest standards of healthcare (DeBruine, Jones, Crawford, Welling, & Little, 2010) and highest-income inequality (Brooks et al., 2011), and it would be interesting to know if a similar pattern pertains to facial hair. Although our sample was large, both men's and women's responses to the stimuli might reflect the aggregate outcome of preferences across the sample and future studies testing whether or not judgments of facial hair vary across demographic and ecological settings would be valuable.

Our repeated-measures design, while powerful, did not include individuals unable to grow full beards, nor did it account for the actual levels of the target's testosterone, which influences men's potential to grow full beards (Randall, 2008). Further, we cannot account for the effects of the experimental procedure of removing facial hair on men's confidence, which could have influenced how they were rated. Subtle effects of this kind are known to influence experimental results; for example, women rate photographs of men wearing red t-shirts as more attractive than men wearing other colors of shirt, even when shirts are not visible in the photograph (Roberts, Owen, & Havlicek, 2010). Likewise, wearing a false beard augments men's feelings of masculinity and confidence (Wood, 1986).

As a further caveat to our study, photographs of each subject were all taken in the same sequence of beard growth, beginning with the full-beard condition, followed by clean-shaven and the two intermediate stages of natural re-growth. It is therefore possible that because the photographing sessions were not counterbalanced that the target's confidence or even level of interest in participating changed from one photographic session to another, which would confound the clean-shaven and light stubble compared to the heavy stubble and full beard conditions. Thus, we cannot tell the extent to which our results depend on the beards themselves or the targets' self-confidence as a result of the beard manipulation. Our results do support the view that facial hair significantly affects perceptions of male socio-sexual attributes. The challenge for future research is to uncover how individual differences among men choosing to wear beards and how pattern, density and distribution of their beards are perceived using a larger and more variable sample of men.

Supplementary Materials

Supplementary data to this article can be found online at http://dx.doi.org/10.1016/j.evolhumbehav.2013.02.003.

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