

		Volume 45, issue 5, October 2008	ISSN 0191-8869
<b>PERSONALITY AND INDIVIDUAL DIFFERENCES</b>			
AN INTERNATIONAL JOURNAL OF RESEARCH INTO THE STRUCTURE AND DEVELOPMENT OF PERSONALITY, AND THE CAUSATION OF INDIVIDUAL DIFFERENCES			
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<small>Person. Individ. Diff. is indexed/abstracted in: ASSIA, Curr. Cont. Soc. &amp; Behav. Sci., PASCAL-CNRS Data, Psychol. Abstr., PsycINFO, PsycLIT, Res. Alert, Soc. Sci. Cit. Ind. Also covered in the abstract and citation database SCOPUS®. Full text available on ScienceDirect®.</small>			
<small>ISSN 0191-8869 4(5) 337-436 (2008)</small>			
OFFICIAL JOURNAL OF THE INTERNATIONAL SOCIETY FOR THE STUDY OF INDIVIDUAL DIFFERENCES (ISSID)			

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# Personality and Individual Differences

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## The effects of facial hair manipulation on female perceptions of attractiveness, masculinity, and dominance in male faces

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### ARTICLE INFO

#### Article history:

Received 31 January 2008  
 Received in revised form 8 May 2008  
 Accepted 13 May 2008  
 Available online 24 June 2008

#### Keywords:

Mate preferences  
 Facial hair  
 Attractiveness  
 Dominance  
 Masculinity  
 Humans

### ABSTRACT

The aim of this study was to examine the effects of systematic alterations in male facial hair on female perceptions. A within-subjects design employed one condition (facial hair) incorporating five levels (clean-shaven, light stubble, heavy stubble, light beard and full beard). All levels were applied to three different facial designs, constructed using FACES software. The resulting 15 male faces were rated by 60 females on various attributes. Male faces displaying a full beard were considered the most masculine, aggressive, socially mature, and older. Males with a light beard were considered the most dominant. Males with light stubble were considered to be the most attractive, light stubble was also preferred for both short- and long-term relationships. These findings are discussed in terms of age preferences and good-genes models.

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### 1. Introduction

Certain physical and behavioural features are thought to be adaptations arising via intersexual selection – the tendency of members of one sex to preferentially select certain members of the opposite sex as mating partners (Buss & Barnes, 1986). Darwin referred to intersexual selection as ‘female choice’, because in many species females are more selective in their mate choices than males, and this is thought to reflect differences in parental investment and reproductive success (Buss & Schmitt, 1993). Female animals prefer males who display certain physical characteristics. These features are assumed to be under the control of the gonadal sex-steroids beginning at puberty when the individual enters the reproductive market. These features are thought to form ‘honest’ signals, because the sex-steroids also have immunosuppressant actions, and only individuals in good health and with efficient immune systems can cope with the ‘handicap’ of producing and maintaining such signals (Folstad & Karter, 1992; Zahavi, 1975).

In humans, various facial and bodily characteristics are thought to form a single (condition dependent) sexual ornament advertising health and fertility (Fink & Neave, 2005; Thornhill & Gangestad, 1993; Thornhill & Grammer, 1999). Much research utilising a range of methodologies has focused upon facial and bodily attractiveness (for review see Etcoff, 1999) and considerable research has been directed towards those facial characteristics that appear to influence

perceptions of attractiveness. For example, researchers have discussed the significant effects of facial averageness and symmetry on judgements of attractiveness (for reviews see Fink & Neave, 2005; Rhodes, 2006). An additional feature thought to be of importance for females' rating male faces relates to sexual dimorphism, i.e. the degree of masculinity expressed by various facial features. Testosterone (in association with growth hormone at puberty) is assumed to affect a number of facial features that determine perceived masculinity, in particular the lateral growth of the cheekbones, jawbone and chin, the forward growth of the eyebrow ridges, and the lengthening of the lower face, leading to a more robust face shape. The absence of androgens, or the presence of estrogens is thought to lead to a more gracile face shape with high eyebrows, smaller and more rounded jaw line, and fuller lips (Enlow, 1996). Masculinized facial features that have developed as a consequence of higher levels of circulating testosterone (or greater receptor sensitivity to existing levels) are thought to act as honest indicators of good genes (Thornhill & Gangestad, 1993).

Female preferences for masculine traits in male faces is however equivocal. Ratings of attractiveness have been found to positively correlate with masculinity (e.g. Cunningham, Barbee, & Pike, 1990; Neave, Laing, Fink, & Manning, 2003). In addition, some studies have reported an overall preference for masculinized male faces (Johnson, Hagem, Franklin, Fink, & Grammer, 2001; Keating, 1985) and that certain masculine features (e.g. large chins) are attractive in male faces (Cunningham et al., 1990; Grammer & Thornhill, 1994; Scheib, Gangestad, & Thornhill, 1999). However, other studies have indicated that females prefer more feminized

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male faces (e.g. Penton-Voak, Jacobson, & Trivers, 2004) and it has been suggested that such preferences may reflect desirability for more positive personality traits, indicating a more reliable partner and a potentially better parent (Perrett et al., 1998). A possible confound here relates to the fact that female preferences for male faces may not remain static, but instead may fluctuate across the menstrual cycle depending upon the female's fertility. Thus, preferences for masculinity (in short-term partners) appear to peak around ovulation when the female is at maximum fertility (Penton-Voak & Perrett, 2000; Penton-Voak et al., 1999); this fluctuation in masculine preferences being argued to reflect a good-genes model (Gangestad, Garver-Apgar, Simpson, & Cousins, 2007).

The focus of this current study is not facial masculinity *per se*, but rather on one signal of facial masculinity. The presence of facial hair ('beardedness'), is a powerful sociosexual signal, and an obvious biological marker of sexual maturity (Randall, 2004). In evolutionary terms this sexually dimorphic trait provides no obvious survival advantages for a male, but is a likely candidate for sexual selection (Barber, 1995). Guthrie (1970) suggested its value in signalling aggression during inter-male fighting, perhaps by the perceived enhancement of the lower jaw, emphasising the teeth as weapons. This indicates that facial hair may have been sexually selected by females on the basis of associated male success, despite its threatening appearance. Clean-shaven faces therefore may suggest appeasement, as well as being an obvious sign of sexual immaturity (Guthrie, 1970). Research to date has indicated that female attitudes towards male facial hair are not always consistent, some studies report positive associations between facial hair and certain behavioural/personality attributes, whilst others find negative associations.

For example, Kenny and Fletcher (1973) reported that bearded males were considered more enthusiastic, sincere, generous, extraverted, masculine, inquisitive, and stronger than clean-shaven males. Pellegrini (1973) noted that attributions of masculinity, maturity, attractiveness, dominance, self-confidence, and courage were enhanced as the extent of beardedness increased from clean-shaven to moustache, and through goatee to full beard. Similarly, Addison (1989) found that bearded males were perceived as being more masculine, aggressive, and dominant than clean-shaven men. Reed and Blunk (1990) reported that facial hair led to increased perceptions of attractiveness, competency and composure. Alternatively, Feinman and Gill (1977) found that females expressed dislike for a potential partner possessing a full beard; however, these results were obtained via vignettes that provided only written descriptions of the males.

Muscarella and Cunningham (1996) examined the effects of facial and cranial hair manipulation on physical and social perceptions. Two levels of facial hair were employed, short dark beard and clean-shaven. Different combinations of facial and cranial hair were applied to six male faces (using wigs and fake facial hair) the resulting photographs then being rated by females. Males with facial hair were perceived as being more aggressive, older, less attractive, and were subject to reduced perceptions of social maturity in comparison to clean-shaven faces. Wogalter and Hosie (2001) demonstrated that clean-shaven faces were regarded as being significantly more youthful, attractive, and sociable than bearded faces. Finally, Shannon and Stark (2003) reported equivocal results for beardedness and attractiveness, and failed to show that facial hair was associated with negative personal attributes.

A likely explanation for the somewhat conflicting results described above relates to the different methodologies employed to display facial hair. Some studies have only employed two levels – clean-shaven versus full beard (e.g. Addison, 1989; Kenny & Fletcher, 1973; Wogalter & Hosie, 2001), whilst others have used more conditions: Reed and Blunk (1990) and Shannon and Stark (2003) had three levels, whilst Pellegrini (1973) had four levels

of facial hair. All studies have employed different methodologies to create and present the stimuli. Thus, Pellegrini (1973) used photographs, Reed and Blunk (1990) used drawings, Wogalter and Hosie (2001) and Shannon and Stark (2003) employed specialist computer software.

An additional factor to consider is that whilst evolutionary theories emphasise the importance of male status and dominance in male attractiveness, research actually suggests that this only holds true up to a certain point. On one hand, a female might desire a male who is strong, mature, and dominant, but is also perhaps seeking a faithful, cooperative, and caring partner. Indeed, it has been shown that male faces combining elements of both mature and childlike features are perceived as being the most attractive (Cunningham et al., 1990). Previous studies assessing the impact of facial hair of female perceptions of male faces have typically utilised conditions including clean-shaven, moustache, and full beards, faces with varying degrees of stubble have not been assessed. Stubble indicates that whilst a face is not immature, it is also not strongly masculine (i.e. it signals the potential to grow a full beard), then it is important to assess female perceptions of male faces varying in facial hair covering the full range of possibilities.

Therefore, in this study we assess female perceptions of male faces with five levels of facial hair (clean-shaven, light stubble, heavy stubble, light beard and full beard). In line with the majority of previous studies we predict a linear positive relationship between the extent of facial hair and perceptions of aggression, masculinity, dominance, social maturity and perceived age. For ratings of attractiveness however we assume a non-linear (inverted U-shaped) relationship, i.e. that faces with stubble (either light or heavy) will receive the most positive ratings, whilst clean-shaven and bearded faces will receive the lowest ratings. As previous studies have indicated that females prefer more strongly masculinized faces in a short-term partner (e.g. Little, Jones, Penton-Voak, Burt, & Perrett, 2002) then we assume that the clean-shaven face will receive the lowest rating as a preferred short-term partner, but make no specific predictions concerning the extent of stubble/beard in this regard. Similarly, as less masculinized attributes are preferred in a long-term partner (e.g. Waynforth, Delwadia, & Camm, 2005) we assume lower ratings as facial hair increases, but note that the clean-shaven face (perhaps perceived as being too immature) might also receive low ratings.

## 2. Methods

### 2.1. Participants

The sample comprised 76 female undergraduates from Northumbria University, UK, aged 18–44 (mean = 21.7, *SD* = 5.20), 16 acted as raters in an initial pilot phase to establish the final pool of faces, the remaining 60 acted as participants in the final rating phase. All were obtained by means of opportunity sampling and did not receive payment for their participation.

### 2.2. Materials and procedure

The male faces used as stimuli were created using FACES, a software programme enabling the construction of realistic faces from a large database of facial features. This software has been used previously to create stimuli for this type of research (Shannon & Stark, 2003). The faces were constructed to have an apparent age between 18 and 25. In order to ensure that the final set of faces were equivalent in terms of general attractiveness, in an initial phase 10 clean-shaven male faces were constructed. Females (*N* = 16) then rated them for attractiveness using a Likert-type scale (1 = very



Fig. 1. An example of one of the faces used in the current study with each stage of facial hair represented.

unattractive, 9 = extremely attractive). Three faces were then selected as they were rated equivalently in terms of attraction (each scoring on average between 5.9 and 6.2 on the scale).

For each of the three faces facial hair was systematically and equivalently altered to give five conditions (clean-shaven, light stubble, heavy stubble, light beard and full beard), resulting in 15 faces in total. See Fig. 1 for an example of the faces. Each face was then presented in a randomised order and rated (using a 7-point scale) by the remaining female participants ( $N = 60$ ) on the following sociosexual variables: masculinity, aggression, dominance, attractiveness, social maturity. In addition, the participants also stated the extent to which the male would be desirable for a romantic partner in a short-term and a long-term relationship, and finally gave an indication of how old (in years) they thought the male was. Following the provision of written informed consent, participants were tested alone in a laboratory cubicle and the rating took approximately 15 min. Each participant was fully debriefed afterwards. The protocol received approval from the School of Psychology and Sport Sciences Ethics Committee.

### 2.3. Statistical analyses

We used a one-way repeated-measures ANOVA with five levels (extent of facial hair) to analyse the data, with raters acting as the unit of analysis. That is, we used for each participant, each level of beardedness, and each rated attribute converted to a mean score across all three faces. For those attributes for which we expected a linear effect (i.e. masculinity, dominance, aggression, social maturity, and age), the linear contrast was tested. For all other attributes (i.e. attractiveness, preference as a short-term partner, preference as a long-term partner) we used the omnibus  $F$  test. Whenever this was significant, we used pairwise comparisons to test for significant differences between adjacent levels of the factor.

We did not calculate effect-sizes from  $F$  values because these stem from a repeated-measures design and effect-sizes derived from a repeated-measures design are highly ambiguous. Therefore, we calculated all effect-sizes as if a between-subjects design had been employed. In this way, the effect-sizes are smaller but more meaningful (Hönekopp, Becker, & Oswald, 2006). For those attributes for which we expected linear relationships, we computed  $r$

effect-size, i.e. the correlation between the scores and the ordinal number of facial hair condition (Rosenthal, Rosnow, & Rubin, 2000). For the other attributes, for which we had less clear expectations, we computed Cohen's  $d$  between those two facial hair levels that gave rise to the highest and lowest ratings.

### 3. Results

In all ANOVAs, for those attributes for which we did not expect a linear relationship, Mauchly's test of sphericity was significant, therefore the  $F$  statistics reported in these analyses are Huynh-Feldt corrected. Initial analyses confirmed that the three faces did not differ on any ratings at any level of facial hair, therefore ratings were collapsed so that subsequent analyses were conducted on average ratings for each level of facial hair. Pairwise comparisons were computed at the 95% confidence interval.

We hypothesised that perceptions of masculinity, dominance, aggression, social maturity, and age would show a linear relation with extent of facial hair, and these hypotheses were confirmed. Thus, ratings of masculinity showed a significant linear increase as the amount of facial hair present increased ( $F_{1,59} = 85.469$ ,  $p < .001$ ,  $r_{\text{effect-size}} = .50$ ), as did ratings for dominance ( $F_{1,59} = 96.671$ ,  $p < .001$ ,  $r_{\text{effect-size}} = .50$ ); aggression ( $F_{1,59} = 48.747$ ,  $p < .001$ ,  $r_{\text{effect-size}} = .45$ ); social maturity ( $F_{1,59} = 57.977$ ,  $p < .001$ ,  $r_{\text{effect-size}} = .50$ ) and age ( $F_{1,59} = 123.530$ ,  $p < .001$ ,  $r_{\text{effect-size}} = .61$ ) (see Table 1).

We further hypothesised that attractiveness ratings would display a non-linear relationship, with stubble (either light or heavy) perhaps receiving the most positive ratings, and once more this was confirmed. Thus, for perceptions of attractiveness, there was a significant main effect of level of facial hair ( $F_{3,546,209,215} = 19.856$ ,  $p < .001$ ). The level of facial hair considered most attractive was light stubble, the least attractive being full beard ( $d = 0.85$ ). Pairwise comparisons indicated that there were significant differences between the following adjacent levels of facial hair, clean-shaven and light stubble ( $p < .001$ ), heavy stubble and full beard ( $p < .001$ ) (see Table 1).

With regard to preferences for engaging in a relationship with the individual, a significant main effect was found for a short-term relationship ( $F_{3,595,212,125} = 15.777$ ,  $p < .001$ ) with males displaying light stubble being most favoured, and males displaying a full

Table 1  
Mean ratings for each attribute by level of facial hair (SDs are in parentheses)

	Clean-shaven	Light stubble	Dark stubble	Light beard	Full beard
Masculinity	3.34 (1.08)	4.14 (.93)	4.52 (.79)	4.79 (.85)	4.92 (.94)
Attractiveness	3.59 (1.01)	4.24 (1.03)	4.15 (.83)	4.02 (.91)	3.40 (.97)
Dominance	3.10 (.95)	3.88 (.75)	4.13 (.78)	4.58 (.87)	4.54 (.89)
Aggression	2.72 (.98)	3.07 (.71)	3.58 (.75)	3.68 (.85)	3.96 (.95)
Social maturity	3.41 (.92)	4.01 (.93)	4.13 (.81)	4.40 (.79)	4.54 (.90)
Short-term relationship	3.28 (1.30)	3.86 (1.18)	3.778 (1.10)	3.69 (1.20)	2.95 (1.02)
Long-term relationship	2.81 (1.25)	3.60 (1.22)	3.57 (1.17)	3.51 (1.11)	3.19 (1.27)
Perceived age	21.24 (2.30)	23.67 (1.90)	24.88 (2.00)	25.48 (2.37)	26.86 (3.20)

beard being least favoured ( $d = 0.83$ ). Pairwise comparisons of adjacent factor levels reveal significant differences between clean-shaven and light stubble, light beard and full beard (both  $p < .001$ ). In addition, a significant main effect for a long-term relationship was found ( $F_{3,565,210,315} = 11.794, p < .001$ ), with males displaying light stubble being most favoured and clean-shaven males being least favoured ( $d = 0.65$ ). Pairwise comparisons indicate that there were significant differences in ratings between clean-shaven and light stubble ( $p < .001$ ), also heavy stubble and full beard ( $p = .045$ ) (see Table 1).

#### 4. Discussion

Previous studies have clearly demonstrated that male facial hair can have a significant influence on female perceptions of male sociosexual attributes. However, the evidence has been somewhat equivocal, with some studies reporting facial hair to have a positive influence, whilst others revealing it to have a more negative influence. This is perhaps due to the fact that previous studies have employed different methodologies to create the faces, and have used few levels of facial hair (usually clean-shaven versus a full beard). In this study we constructed a series of male faces possessing five levels of facial hair in order to more carefully assess the potential effects of facial hair manipulation on female sociosexual attributions. Importantly, we included faces with two degrees of stubble (light and heavy) and two degrees of beardedness (light and full) in order to assess the notion that characteristics signalling a certain degree of masculinity (stubble) might be preferred over characteristics signalling very low (clean-shaven) or very high masculinity (bearded). Using this improved methodology we confirm findings from previous studies that facial hair does have a significant impact upon such perceptions (e.g. Addison, 1989; Cunningham et al., 1990; Feinman & Gill, 1977; Muscarella & Cunningham, 1996; Pellegrini, 1973; Reed & Blunk, 1990; Shannon & Stark, 2003; Wogalter & Hosie, 2001).

In short, we find that our hypotheses were supported, with level of facial hair being associated with alterations in female perceptions. Thus, as facial hair increased in a linear fashion so did female ratings of masculinity and dominance, and such findings are in accord with previous research (Addison, 1989; Kenny & Fletcher 1973; Pellegrini, 1973). In addition, increasing levels of facial hair were associated with increased perceptions of aggression in that bearded faces were perceived as being the most aggressive, whilst clean-shaven faces were rated as being the least aggressive. Once more, this finding is in accord with previous studies (Addison, 1989; Muscarella & Cunningham, 1996). In addition, we found that perceptions of social maturity increased linearly with the amount of facial hair, a finding contrary to that of Muscarella and Cunningham (1996) who noted reductions in perceptions of social maturity with beardedness. However, our finding is in agreement with research by Pellegrini (1973) who also identified an increase in perception of social maturity for males with a full beard. Differences in methodology, definition of 'social maturity', and stimuli could account for this inconsistency. Not surprisingly, our results also indicated that increases in facial hair led to increases in perceived age. Fully bearded males were considered the oldest, in line with previous findings (Muscarella & Cunningham, 1996).

As predicted, a curvilinear relationship was found for perceptions of attractiveness, the optimum level of attractiveness being associated with the faces with light stubble, with clean-shaven and fully bearded faces being rated as the least attractive. This does not support the findings from previous studies (Feinman & Gill, 1977; Pellegrini, 1973; Reed & Blunk, 1990) who identified males with full beards as being the most attractive. This could either reflect methodological differences (we used five levels of facial hair

whereas these studies utilised fewer levels). In addition, it could reflect the fact that social norms associated with facial hair have changed, in some time periods facial hair might be regarded as a symbol of respectability whilst in other periods it might signal nonconformity (e.g. Corson, 1980; Peterkin, 2002). Our finding does however support the assertion made by Cunningham et al. (1990) who identified a female preference in the ability for males to grow a beard (i.e. for stubble, which indicates a certain degree of physical maturity), but not for the presence of a full beard (associated with increased dominance and/or aggression).

In assessment of desirability for a short-term relationship, a female preference for male faces with stubble/light beard was found, with clean-shaven and fully bearded faces being the least preferred. This indicates again that females are not selecting faces displaying relatively high or low masculinity, but are rather preferring males who are clearly mature (post-pubertal) but not too masculinised. The same pattern was found for preferences for a long-term relationship.

It is possible that females are avoiding males with full beards as they are perceived as being much older than those with stubble. However, the perceived age difference was moderate (light stubble = 23.7 years; full beard = 26.8 years), but as the mean age of the female sample was 21.7, a preference for males 2 years older, but not for males more than 5 years older is in accord with previous research (e.g. Kenrick & Keefe, 1992). The preference for a moderately masculinised male for a short-term relationship is in accord with previous studies reporting a female preference for more masculine faces for a short-term relationship (e.g. Little et al., 2002; Waynforth et al., 2005) though it is difficult to equate the relative degree of masculinity between studies.

One limitation of this current study is that we did not control for the influence of the menstrual cycle. Several studies have now demonstrated that female preferences towards masculinity are not fixed, but instead fluctuate with fertility level, more masculine characteristics being preferred during the most fertile phase (e.g. Pawlowski & Jasienska, 2005; Penton-Voak & Perrett, 2000; Puts, 2005). Future studies clearly need to take this into account. Perhaps a preference for facial hair might show some variability over the cycle with a preference for more facial hair (greater perceived masculinity) peaking around ovulation, especially for a short-term sexual partner.

In addition, another key limitation is that we did not control for several within-sex variables that are now known to influence female perceptions of male stimuli. For example, females scoring high on a sociosexuality index are more likely to prefer masculinised male faces (Waynforth et al., 2005); females scoring higher on self-perceived attractiveness prefer more masculine/symmetrical faces (Little, Burt, Penton-Voak, & Perrett, 2001); preferences for facial masculinity are associated with actual or ideal partner masculinity preferences (DeBruine et al., 2005); and raised testosterone level is associated with increased attraction to masculine faces (Welling et al., 2007). Once more, future studies could control for these variables.

In conclusion, our findings extend previous research demonstrating associations between male facial hair and female sociosexual judgements. As we used more levels of facial hair than previous studies we were able to demonstrate different associations depending upon the characteristics being rated. Thus, a positive linear relationship was established for facial hair and assessments of masculinity, dominance, aggression, and perceived age, such that ratings increased as facial hair increased. However, for attractiveness (and preferences for a short- or long-term partner), a non-linear relationship was observed such that clean-shaven and bearded faces were perceived to be less attractive than a face displaying the ability to grow facial hair (stubble). This suggests that females perceive males displaying honest signals of sexual

maturity to indeed be more dominant, socially mature and older, but that such signals are not thought to be necessarily attractive. In the age group sampled here (early 20s) the potential to display such maturity was preferred over the actual possession of such signals. This may reflect a straightforward consideration of the age of the individual (clean-shaven and bearded faces were felt to be too young/old) and/or may reflect good genes models, in that females are showing preferences for male faces reflecting optimum levels of sex steroid hormones, too low reflecting immaturity, and too high reflecting increased dominance/aggression.

### Acknowledgements

The authors express their thanks to Johannes Hönekopp for his constructive comments on an earlier version of this manuscript, and two anonymous referees for their helpful comments on the submitted version.

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